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GABRIEL MANCINI

Date of Birth — Date de naissance
NOV 9 1950

Country of Birth — Lieu de naissance
ITALY

Permanent Address — Résidence fixe
3632 118 ST.
EDMONTON, ALTA
T6J 1W5

Title of Thesis — Titre de la thèse
RELATIONSHIP BETWEEN META-LINGUISTICS AND READING

University — Université
UNIVERSITY OF ALBERTA

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1983

Name of Supervisor — Nom du directeur de thèse
DR. R.F. MULCAHY

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THE RELATIONSHIP BETWEEN META-LINGUISTIC AWARENESS AND READING

by

GABRIEL MANCINI

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled THE RELATIONSHIP BETWEEN META-LINGUISTIC AWARENESS AND READING submitted by GABRIEL MANCINI in partial fulfilment of the requirements for the degree of DOCTOR OF PHILOSOPHY in SPECIAL EDUCATION.

R. Mulcahy
Supervisor

J.P. Das

W.H.O. Schmidt

R.A. Short

Bernard Schwartz

Che Kan Leong
External Examiner

Date Sept. 27/83

ABSTRACT

Meta-linguistic awareness has been measured in a variety of ways and this ability has been highly related to proficiency in reading. The present study attempts to investigate the relationship among a number of meta-linguistic tasks which have been reportedly used as measures of meta-linguistic awareness. This study also endavours to examine this relationship by comparing children's performance on meta-linguistic tasks to their performance on specific skills related to reading, across age and reading proficiency.

The sample (N=390) consisted of 50 subjects at each of three age levels within the Superior Reading group (7, 9 and 11 years of age) and two age levels (9 and 11 years) within the Average, Below Average and Significantly Below Average Readers. Each ability level encompassed 40 subjects.

The three meta-linguistic tasks utilized included: 1) Sentence Ambiguity (interpretation of jokes), 2) Interchangeability of Labels, and 3) Word Awareness. The specific tasks related to reading encompassed: 1) Auditory Phonological Segmentation and Synthesis, and 2) Morphophonological Knowledge. Short Term Memory was also utilized to examine the relationship of Short Term Memory capacity to meta-linguistic awareness, specific skills related to reading and reading ability.

The major hypotheses tested were: 1) Meta-linguistic tasks can be distinguished from the specific tasks related

to reading. 2) There will be a positive relationship between children's performance on meta-linguistic tasks and their performance on specific tasks related to reading. 3) This positive relationship will increase with age and reading level.

A factor analysis of the data indicated that all meta-linguistic tasks, with the exception of Long, Short and Difficult Word task measured a distinct process different from the specific tasks related to reading. The first factor was labeled Meta while the second factor was labeled Specific. These results confirm the hypothesis that meta-linguistic awareness and specific tasks related to reading seem to be measuring two different processes.

An analysis of variance indicated that although there was no significant interaction between meta-linguistic awareness and reading ability at the 9 year old level, there was a significant interaction at the 11 year old level for Superior and Average readers. This seems to suggest that Superior readers tend to rely more on meta-linguistic ability than the lower reading ability group.

Qualitative analyses of the subjects' responses to meta-linguistic tasks indicated that performance increases as a function of age and reading level.

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I. INTRODUCTION

The study of reading disability has expanded rapidly over the past decade and has now become one of the most significant areas of special education. Reading has generally been considered a complex task involving the integration and orchestration of a variety of different components. It is not surprising, therefore, that a deficiency in any of the components may result in reading difficulties. Reading can be considered a perceptual task in that it requires fine perceptual discrimination involving closure (eg. C and O), rotation transformation (eg. b and d; or M and W), line curve transformation (eg. U and V) and sequencing ability (which facilitates the recognition that 'PAT' is not the same as 'TAP').

Some evidence (eg. Vellutino, 1978) suggests that perceptual problems in poor readers may be secondary manifestations of verbal mediation deficiency and possibly language problems. In fact, research has indicated that reading is foremost a linguistic skill which subsumes a complete appreciation of visual symbols to convey a message. Furthermore, it has been suggested that reading requires auditory discrimination of speech sounds to facilitate the analysis of the internal structure of printed words and the phonetic structure of spoken language (Downing, 1973; Elkonin, 1973; Liberman & Shankwieler, 1963; Mattingly, 1972).

Other findings have suggested that poor readers demonstrate a marked weakness in the acquisition of morphophonological generalizations, (the correct use of word endings to indicate tense, number and possession) a skill generally acquired by normal readers at approximately 7 years of age. Mastery of the mechanical components of reading does not constitute proficiency in reading. Reading also requires comprehension and awareness of what reading is all about. Reading, like speech, is essentially a linguistic code for communication.

Despite the diversity of research and application in the field of reading disability, little attention has been directed to the area of meta-linguistic awareness and its relationship with reading acquisition.

A review of the most recent literature on learning disability suggests the importance of using a meta-linguistic approach in contributing to a greater understanding of reading disability.

Meta-linguistic awareness has been defined, in information processing terms, as:

> The ability to perform mental operations on the products of mental mechanisms involved in sentence comprehension; that is, the systematic phones, the words and their association meanings, the structural representation of sentences, and the sets of interrelated propositions (Tunmer & Fletcher, 1981, p.175).

Meta-linguistic awareness has also been defined as "reflective understanding of language and awareness of the nature of language" (Dejarlais & Lazar, 1976, p.11). Research is accumulating which suggests that the development of meta-linguistic abilities may be related to reading ability (Ehri, 1979; Tunmer & Bowey, 1980). Furthermore, since most researchers in the area of reading regard spoken language as a fundamental cornerstone to reading acquisition, the basic task in acquiring reading is to transcribe the printed language onto the existing language. This requires the ability to manipulate the structural features of spoken language. The meta-linguistic awareness of spoken language should, therefore, relate highly with learning to read since weakness in the former should hinder the discovery of the properties of spoken language. These properties bridge written and spoken language forms.

There appears to be considerable individual variation in the development of meta-linguistic skill. Some individuals are not only conscious of the linguistic patterns but also take considerable pleasure in exploiting this consciousness into verbal jokes, punning and linguistic analysis. On the other hand, others seem to be quite unaware of the intricacies of language and seem quite surprised when obvious linguistic patterns are presented to them. This variation provides a marked contrast to the relative consistency with which language develops in individuals. It seems that the "synthesis of an utterance is one thing; the awareness of the process of synthesis is quite another " (Mattingly, 1976, p.140).

Meta-linguistic awareness is by no means only a passive phenomenon. Individuals can utilize this awareness to control, quite consciously, their linguistic activities by appreciating, for example, that words are not only part and parcel of their referents but also can be used to denote abstract concepts. Furthermore, meta-linguistic awareness can facilitate the understanding of different meanings within written texts or language such as in the appreciation of ambiguities in sentences.

Research on meta-linguistic development has been rather scant and has focused mainly on young children (pre-schoolers, first and second graders). Nevertheless, some experimenters have reported that metalinguistic awareness plays an integral role in reading acquisition (e.g., Ehri, 1978), while others have reported that meta-linguistic awareness encompasses "not so much awareness but access to the individual's knowledge of the grammatical structure of sentences "(Mattingly, 1979, p.2). These suggestions however have been made with little empirical evidence. To date, investigators have not arrived at a common consensus as to which tasks indeed make up the framework and measures of metalinguistic awareness. Therefore, if one wishes to discover how meta-linguistic awareness develops, and its relationship to the acquisition of academic skills (reading), one must know what it is that is being acquired. Thus, achieving a suitable description of the phenomenon called meta-linguistic awareness is the first responsibility of investigators in this area.

The results of investigations thus far can be criticized for their purely descriptive and correlational findings. The techniques adopted, within a rather restricted population, have failed to differentiate between the development and influence of meta-linguistic awareness. In addition, the meta-linguistic tasks employed by most researchers have been limited; no attempt has being made to correlate them, or to determine the internal consistency among these meta-linguistic tasks. The simplicity of research, as well as its neglect of the psychology of meta-linguistic rules, provides a major stumbling block in researching meta-linguistic awareness.

Very little research has specifically investigated the relationship between meta-linguistic awareness and reading acquisition. The major emphasis in research has been devoted to investigating meta-linguistic development within young populations and not with reading disabled children or with older age groups. Consequently, it provides scant evidence for understanding the development of metalinguistic awareness and its relationship to reading acquisition.

Some investigators (e.g., Read, 1978; Sinclair Jarvella & Levelt, 1978) have utilized specific reading skills as examples of general meta-linguistic tasks, thereby obtaining high correlations between reading proficiency and metalinguistic awareness. This approach has difficulties as it basically provides and reiterates the high correlations between specific reading skills and general reading proficiency. The author will address this problem by attempting to differentiate between generic meta-linguistic skills and specific reading skills. This approach, it is felt, may be more theoretically sound and serves the purpose of facilitating empirical work that is both theoretically based and relevant to immediate pedagogical concerns. The pedagogical usefulness of this study rests in the attempt to understand the relationship between meta-linguistic awareness and the acquisistion of reading by using different populations of readers.

Different studies have adopted a variety of tasks all presumably measuring meta-linguistic abilities. However, to date no attempt has been undertaken to determine which tasks can be taken as pure measures of meta-linguistic abilities. Consequently, inconsistent results have been found which may be due to the different tasks adopted as presumable measures of meta-linguistic abilities in different studies.

Within the context of this study, one of the primary purposes is to examine the inter-relationship of a variety of tasks which have previously been used as measures of meta-linguistic abilitiy. To achieve this goal, the tasks will be differentiated between generic meta-linguistic tasks that do not appear to be directly related to formal instruction and those tasks that are learned in school or are a consequence of formal instruction. The latter tasks require either the reporting and/or application of learned rules (e.g., phonological segmentation and synthesis). The formner tasks require the individual to 'go' beyond the obvious surface features of language by requiring the individual to actually manipulate and interpret the language itself.

The present study will also explore the development of meta-linguistic skills in Superior Readers (SR) of ages 7, 9, and 11 years, Average Readers (AR), Below Average Readers (BA) and Significantly Below Average Readers (SBA) aged 9, and 11 years. More specifically, the objective of the proposed study is to obtain answers to the following major questions:

1. What is the relationship between the generic meta-linguistic tasks and the specific tasks related to reading?
2. Are there any significant differences between superior readers (SR), below average readers (BA) reading disabled (RD) and severe reading disabled children (SRD) in their meta-linguistic skills as measured by tests of Word Awareness, Sentence Ambiguity and Interchangeability of Labels?.
3. Are there significant differences between the four ability groups on tasks related to reading skills as measured by Auditory Phonological Segmentation and Synthesis, Short Term Memory, and Morphophonemic

Knowledge Tests?

The Organization Of the Research

The following chapter will include a review of the literature and will outline the theoretical foundations on which the empirical components of the study rest.

Chapter 3 provides a discussion of the research design and methodology, rationale for the study, choice of tasks, major hypotheses, description of subjects, test instruments and procedures.

II. REVIEW OF LITERATURE

This chapter presents a selective review of the literature related to reading, reading disability, language acquisition and metalinguistic awareness.

The preceding section indicated that reading disability could be subsumed under perceptual deficits and language based deficits. Competing hypotheses as to the nature of reading disability will be introduced in the first section of this chapter.

The next section will present a brief and general review of the nature of language acquisition, to be followed by a section exploring the inter-relationship between cognitive development and language acquisition.

Finally, the last section will explore the literature on metalinguistic awareness which subsumes word awareness, sentence ambiguity and interchangeability of labels.

Review of the Literature and theoretical Foundations

Adults have not always been interested in how children learn to read or in the act of reading itself. In fact, the reports on reading, specifically alphabetic reading, have demonstrated that the process has been historically surrounded by mystery. For example, Socrates postulated that the origin of the alphabet stemmed from the Egyptian god 'Thoth' while the reigning Egyptian king of the time refused to accept the alphabetic script on the basis that it would 'impair' memory and, that, most importantly, reading would undoubtedly result in lack of understanding. Similarly, the Greeks and Romans' attitude towards reading and writing is reflected by their adamant belief that 'evil people' would maintain themselves in the afterlife by teaching these two skills.

Literature has also perpetuated the mysticism which surrounded reading and writing. It seems that the process of learning to read and write was related to some spontaneous phenomenon - that is, self taught literacy. Shakespeare, for example, entertained this notion:

> "to be a well favoured man is the gist of fortune, but to write and read comes by nature" (Much Ado About Nothing).

Mayakovsky, the infamous poet of the Russian Revolution, wrote:

> The human fledgling barely out of the egg grasps at a book, and quires of exercize paper. But I learned my alphabet from signboards, leafing through pages of iron and tin.

(Vladimir Mayakovsky, "My University")

Francis Bacon exemplified the importance of literacy by stating that "Reading maketh a full man, conference a ready man, and writing an exact man". The power of this aphorism cleansed the reading process from the burden of mysticism and occult notions. In fact, the force of this aphorism can be felt and seen in today's society, after some three hundred and fifty years.

The great amount of attention devoted to the area of reading, although a sign of richness and fertility, makes it difficult to arrive at a consensus as to what reading is. For example, some researchers emphasize that reading is basically a "code cracking" process, while others regard the abstraction of meaning as the basic process of reading. There are researchers who view the reading process as encompassing a "bottom up" approach while others expound on the "top down" approach, and still others emphasize an interactive approach which encompasses at times data (bottom up) and sometimes schemata (top down). As can be seen, any attempt to define reading becomes a rather difficult task.

From a linguistic point of view (e.g., Elkonin, 1973b) reading is regarded as the process of transferring information from auditory signs to visual symbols. Along this line of thought, Venezky (1967) views reading as:

> requiring primarily the translation from written symbol to sound, a procedure which is the basis of the reading process and is probably the only language skill unique to reading . . . . comprehension, while a necessary criterion for reading, is a function of both speech and writing (p.102)

Within the frame-work of comprehension, Tinker and McCullough (1962), defined reading as the

> construction of new meanings through the manipulation of concepts already possessed by the

> reader . . . . organized into thought processes according to the purposes adopted by the reader (p.102).

Similarly, Smith (1978) contends that the reader unscrambles meaning "without making any prior decision about words" (p.213). Thus, reading encompasses the process of transferring visual linguistic representations into meaning rather than transcribing visual symbols into sound (Downing & Leong 1982).

The discussion, thus far, although superficially adhering to the dichotomisation between decoding and comprehension, should not be understood so simplistic. In fact, Elkonin argues rather stringently that "the child must understand the features of speech encoded in the written system" (Downing & Leong 1982, p. 3). Therefore, reading should not be regarded as an either / or process but rather as a tightly interconnected system in which decoding and comprehension are totally interactive.

Gibson and Levin (1975, p.5) view reading as " extracting meaning from text " and encompassing three components: 1) decoding written words into sounds, 2) tapping the lexicon, or mental filing system to provide meaning to the decoded sounds and 3) the incorporation of the lexical meaning into the individual's language acquisition process. Within the same school of thought Venezky (1976) refers to the reading process as " the translation of writing to a form of language from which the reader already is able to derive meaning" (p. 6). Viewing reading within this framework presupposes the necessity of linguistic processes and language abilities which can be utilized for the reading process.

In reading, the individual is forced to deal with different linguistic components such as vocabulary, grammatical features of syntax and semantics (Downing & Leong 1982). Further, reading also requires an understanding of the phonetic structure of both spoken and printed words (Elkonin, 1973; Mattingly, 1972; Savin, 1972) in order to decode proficiently. Thus, the acquisition of reading can be regarded as a two stage process: 1) the decoding stage, and 2) the meaning abstraction stage. The first requires the child to decode words through the association of sound with printed words; the second stage emphasizes the process of obtaining meaning from the printed text or graphic equivalent.

Smith (1971) contends that the task of beginning readers is to utilize a set of rules to translate the surface structure (visual symbols) into deep structure (meaning). Reading, according to Smith, cannot occur primarily via a visual process. He does not discount some information being visual, (e.g., the printed page), but he places emphasis on non-visual information; that is, information the individual possesses about reading, language and the world knowledge that is brought by way of the printed page. Lerner (1976)suggests that "the reader who concentrated on words is unlikely to get much meaning from the passage" (p.308).

Too often reading is presented to children in isolation from knowledge of language "which in natural turn of events reading presupposes" (Furth,1978,p.65). Similarily, language is also viewed and treated as a separate component from intelligence from which general knowledge and understanding are abstracted.

The following section will attempt to clarify the place of reading within a theoretical framework of language acquisition and cognitive development.

Psycholinguistically speaking, a child by seven years of age reflects a developmental change in his language. More precisely, the child's language which was previously unanalyzed, iconic and situation bound is transformed to one that is more "abstract, symbolic and categorical utterances at the phonological, morphophonemic, lexical, and syntactic-semantic levels of linguistic functioning" (Doehring et al., 1981, p.109). The linguistic changes at the phonological level are related to the facility with which one perceives the linguistic units within utterances. The sentence previously perceived as a gestalt, can now be segmented into phrases, words, syllables and phonemes and, furthermore, these linguistic units can be synthesized to form new syllables, words, phrases and sentences (Doehring et al., 1981; Karpora, 1977). This facility is directly related to reading proficiency, since the individual must segment utterances into phrases, words, syllables, and phonemes proficiently in order to identify their counterparts in written language (Bruce, 1964; Fox & Routh, 1975; Elkonin, 1973; Liberman, Shankwieler, Fischer and Carter, 1974; Rosner & Simons, 1971). The ability to segment utterances appear to develop, at least partially, as a result of the child's engagement with language games such as rhyming, syllabication, and using nonsense words (Kirshenblatt-Gimblett, 1976). This ability to decode words phonetically has been described by such terms as "metalinguistic awareness" (Read, 1978), and "metacognitive awareness" (Sinclair, Jarvella, and Levelt, 1978).

Somewhat consistent with this line of thought in language usage are the recent investigations into the acquisition of morphophonemic rules (Palermo, 1978; Vaughn-Cook, 1977). Morphemes are the smallest meaning-bearing units in a language, and phonemes are the smallest unit of sound in any particular language.

Morphophonemes are abstract phonological units representing corresponding phonemes in different allomorphs of one morpheme. Thus morphophonemic rules describe how the pronunciation of a morpheme can be altered as a function of the phonemes that precede or follow it in a word. For example, in the spoken words 'divine' and 'divinity', 'grateful' and 'gratitude' and 'meter' and 'metric', the child must know the morphophonemic rule that varies the pronunciation but not the meaning of the morphemic unit as its grammatical function changes (Doehring, et al., 1981, p.210). Similarly, in the spoken words 'bugs', 'books'and 'busses' , the child must possess the knowledge of phonemic rules that are directly related to changing the pronunciation of final sounds, and at the same time, not changing the underlying meaning of pluralization. This ability in the abstraction and application of morphophonemic rules is related to reading performance since written words mirror morphophonemic structures in complex ways (Chomsky & Halle, 1968; Chomsky, 1970; Mattingly, 1980; Venezky,1970). For example, the underlying morpheme, unlike sound-letter correspondence, is maintained in the following printed words: 'divine' and 'divinity', and 'ducks' and 'pigs'(Doehring et al., 1981). Overall, the correct usage of word endings denoting tense, quantity, and possession requires both phonemic and morphophonological knowledge.

Within the same age period (7 yrs. of age) linguistic changes occur at the phonological level, lexical changes also become apparent (Francis, 1972). For the first time children "associate words on a paradigmatic basis" as belonging to the same grammatical class, a significant difference from the prior tendency to associate words "as belonging to the different grammatical classes of adjacent words in the undifferentiated utterance" (Doehring, et al.,1981, p.111). This new ability reflects a change in long term memory from a pure episodic, situational and organizational form to a considerably more abstract, categorical and semantic memory (Doehring et al.,1980; Petrey, 1977; Tulvin, 1972) where words are apportioned into "semantic fields" (Doehring, et al., 1981; Luria & Venogradova, 1959; Marshall and Newcombe, 1966; Weigel and Bierwisch, 1970).

The facility with which students respond to words as abstract units, and not as a component of the total utterance, provides the impetus to retrieve words quickly from semantic memory via a process called automatic lexical access (Doehring, et al.,1981). According to Olson and Nickerson (1978), this process is related to the reading of unfamiliar texts which do not include situational and interpersonal components of spoken language.

The shift from viewing and treating utterances as undifferentiated wholes requires the acquisition of rules for analyzing the syntactic-semantic structure of utterances (Doehring et al., 1981). This ability is reflected in the understanding of passive sentences (Slobin, 1966,); positive and negative understanding of semantic usage (McNeil, 1970); understanding complex syntactic-semantic relationships in sentences encompassing such words as "ask" and "tell" (Chomsky, 1969; Kessel, 1970) and proper usage of metaphors (Gardner, 1974). According to Doehring et al., (1981) and Olson (1975), the ability to process syntactic-semantic structures epilinguistically requires the logicogrammatical relationships which are also important for understanding written texts.

Overall, the literature thus far presented indicates that at approximately age 7, one finds a shift in psycholinguistic development and abilities: the child begins to process linguistic structures epilinguistically and consequently language becomes more abstract and symbolic. Categorical utterances are observed at the phonological, morphophonemic, lexical and syntactic semantic levels of linguistic functioning (Doehring, et al., 1981).

It is interesting to note that this shift in language development may coincide with cognitive development. The relationship between cognition and language is indeed a complex one. Some schools of thought argue that the two develop quite independently of each other, whereas others believe language development provides the impetus for cognitive development. Still others maintain that cognitive development shapes language development. According to Desjarlais and Lazar (1976), language and cognition should not be regarded as two independent developments with a single causal relationship. Rather, "they form a tightly interconnected system in which the growth of one influences the growth of the other" (Dejarlais and Lazar, 1976, p.39).

The increase in intricacy and length of sentences a child uses exemplifies language development during childhood. This development correlates highly with verbal measures of short term memory. This may be interpreted to mean that as memory increases, it facilitates the usage and storage of longer and more complex sentences. Research thus far, however, supports the hypothesis that the child's increased capacity to use mnemonic strategies such as chunking facilitates the increase in verbal memory (e.g. Olson, 1974; Torgessen and Goldman, 1977).

Piaget, in his developmental theory, has argued that the transition from preoperational thought to concrete operations involves a progressively increasing ability to decenter attention. Thus, an increased ability to decenter permits the child to consider simultaneously the "pre-and-post transformational stage of display"(Hakes, 1978, p.14). The concrete operational stage marks the child's increasing ability to deal systematically with relationships (Hakes, 1978) and simultaneously organize several different dimensions of a situation (Ginsberg & Opper, 1969; Waller, 1977). Clark (1974) suggests that "the semantic properties of spatial and temporal terms are related to such cognitive strategies". Thus, it seems that cognitive and linguistic abilities may interact developmentally during the time the child is beginning to master the reading process. Evidence seems to suggest that these changes do not occur as a smooth transition from situation-bound to context-free linguistic processing (Doehring, et al., 1981); rather they seem to involve a complex reorganization which may disrupt behavior (Carey & Dimond, 1980; Cromer, 1976; Doehring, et al., 1981; Gibson, 1971).

In light of the above, it seems plausible to suggest that those children who have failed to complete the normal developmental shift in the language area may find the process of reading a considerable challenge. Furthermore, it is quite conceivable that difficulties in reading may not be accompanied by disabilities in all components of linguistic functions. It could be hypothesized that individual differences in linguistic impairment may directly correspond with individual differences in patterns of reading disability. The following section will explore this idea.

Introduction to Reading Disability

Previous studies have defined reading disability in a variety of ways: perceptual deficits (e.g., Bender, 1938); and language deficits (e.g., Vellutino, 1979). Recently, Pavlidis (1981) has provided 10 points which define reading disability or dyslexia. The term reading disability and dyslexia have also been used interchangeably. In some cases, they mean the same disorder while in other situations a completely different interpretation is subsumed by these two terms.

Gibson and Levin (1975), defined reading as "the interpretation of symbols" (p.5). A more expansive defination is provided by Downing and Leong (1982): "reading is the interpretation of symbols" (p.4). Haines and Leong (1983) explain that:

synbols extend both in time and in space and include

> musical notations, cartographic symbols, Braille, ambient print such as labels and displays on video machines and, of course, different writing systems. Whichever definition is used readers must (a) decode written symbols to sound, (b) have recourse to the *internal lexicon* or the internal abstract, mental dictionary to extract meaning from the printed word from semantic memory and (c) incorporate this memory into their language learning system (p.1).

Within the context of this study reading problems are defined as follows: the inability to meet the necessary linguistic demands of the reading task thus, performance is sub-standard according to age grade norms in both the decoding and comprehension areas.

As discussed earlier, linguistic deficiencies could either be the cause or the result of reading disability. Since empirical evidence to date is not sufficiently conclusive about the cause and effect relationship of language deficits and reading disability, Doehring and Aulls (1979) suggest that this relationship be regarded as an interactive one. The manifestation of these interactive disabilities does not necessarily express itself in spoken language, since "linguistic deficiencies such as difficulty in segmenting phonemes may hamper reading acquisition but may not noticeably affect spoken language" (Doehring et al., 1981, p.107).

The literature indicates evidence that youngesters who have problems with reading also demonstrate simultaneous difficulty in a variety of language related skills: poor readers demonstrate marked deficits in utilizing syntactic cues while reading (e.g., Weinstein and Rabinovitch, 1972; Willows and Ryan, 1981); difficulty with organizing input from text, and moreover, failing to appreciate the importance of information units within passages (e.g., Oakan, Wiener and Cromer, 1971); poor readers tend to treat words as unrelated units and not as belonging to a meaningful unit (Steiner, Weiner and Cromer, 1971). Thus, grammaticality and contextual meaning cues may be completely ignored. Smith (1975), has suggested that:

> Older children with low reading ability tend to read as if they neither expect nor care that the material might make sense, but seem determined to get all the right words.... identification suffers as a problem reader generates anxiety all of which leads to a reluctance to predict. Thus the poor reader tends to engage in a laborious word-for-word reading, and his difficulty becomes a self-fulfilling prophecy (p.34).

Theorists have usualy ascribed reading deficits to one or more of the following causes: (a) visual processing deficits (Orton, 1925, 1937; Bender, 1956, 1957, 1975; Herman, 1959); (b) language and speech disability (Rabinovitch, 1959; Downing, 1973; Elkonin, 1973; Liberman &

Shankweiler, 1979); (c) maturational lag and general deficits in cognitive processing (Orton, 1925, 1937; Eustis, 1947a; Olson, 1949; Bender, 1956, 1957; Satz & Sparrow, 1970); (d) difficulties in temporal-order processing (Zurrif & Carson, 1970; Bakker, 1972; Corkin, 1974); (e) lack of motivation (Stevenson, 1973); (f) anxiety (Feldhusen & Klausmeir, 1962; Stevenson & Odom, 1965); (g) neurological and central nervous system dysfunctions (Bender, 1958; Critchley, 1970); h)individual differences in cognitive ability due to genetic factors (Hirsh, 1963); (i) differing environmental influences, (Maher, 1963); (j) physical damage to the brain resulting from external factors (Clement, 1966); (k) impoverished diet during the early years of childhood (Birch & Gusson, 1970; Scrimshaw & Gordon, 1968); and finally (l) lack of early learning and experiences (Hunt, 1961; Zamm, 1973).

Certain theorists have attempted to differentiate systematically between different types of reading disabilities Working within this framework, Boder(1971, 1973) reported three types of reading disabilities by analyzing children's reading and spelling scores. The first type was described as 'dysphonetic', which consisted of 67% of his subjects who exhibited deficiency in the knowledge of letter sound correspondence. A smaller group of 10% demonstrated some degree of proficiency in letter sound correspondence, but were unable to read words as wholes and to visualize the words during the process of spelling them.

This group was described as "dyseidetic". The remaining 23% formed the third type and demonstrated the characteristics of both the dysphonetic and dyseidetic types, since they revealed reading as well as spelling problems. This third group was labelled as 'dysphonetic-dyseidetic'. It is to be noted that Boder's classifications supported those found by Johnson and Myklebust (1967) and Kinsbourne and Warrington (1963a,) who distinguished between visual-perceptual and auditory -linguistic subtypes of reading disability.

Further classifications were provided by Mattis, French and Rapin (1975). They found 38% of reading disabled children fell within a language disorder category, which included difficulty in naming letters and objects, listening comprehension, oral sentence repetition and speech sound discrimination. A second group, which consisted of 37% of the children demonstrated articulation-graphomotor dyscoordination which was related to deficits in sound blending and graphomotor ability. A third group of 16% demonstrated a visual perceptual disorder which was reflected in nonverbal abilities (eg. P.IQ., Ravens Progressive Matrices, and Benton Visual Retention Test). Further evaluation of these subgroups (Mattis, 1968) revealed somewhat similar results - 63% language disorder, 10% articulatory-graphomotor dyscoordination and 5% as visual perceptual disorders,while 9% had mixed disorders. As in Boder's study, visual disorders were identified with a similar low frequency.

Myklebust (1978) reported 5 subtypes of reading disability. The first type was labeled 'inner language dyslexia' (word calling). This term denotes deficiency in 'integrative neurosensory learning', which encompasses proficiency in grapheme-phoneme encoding skills accompanied by poor comprehension. The second subtype 'auditory dyslexia' was marked by a deficiency of 'intraneurosensory learning', which translates into marked weakness in symbolization and the coding of written language but no difficulty in comprehending spoken language. The third subtype, 'visual verbal agnosia' was described as having poor visualization or symbolization abilities with no visual perception or discriminatory problems. The fourth subtype, 'intramodal or cross modal dyslexia' was depicted by the inability to transfer visual processes into auditory processes with both visual and auditory processes by themselves being intact. Lastly, the fifth subtype, 'auditory-intramodal dyslexia' involved deficiency in visual processes. It must be noted that Myklebust provided very few descriptive characteristics of his dyslexic groups, especially for the auditory and visual dyslexics. His contribution lies in his postulation of intramodal dyslexia, which to date has not been investigated. Moreover, his 'inner language dyslexia' is in accordance with Mattis' language disorder group but with no manifestation of grapheme-phoneme disorders (Doehring et al., 1981).

Finally, Pirozzolo (1979) provided evidence of two subtypes of reading disabilities: 'auditory-linguistic disorders', which manifest themselves in low V.IQ. and phonologically weak skills; the second subtype, 'visual-spatial disorders' involved low P.IQ., visual discrimination errors in reading and visual non-verbal deficits. It is interesting to note that the latter subtype was observed only one fourth as frequently as auditory linguistic disorders (Doehring et al., 1981).

The research into multi-factor causality of reading disability has revealed inconsistent results. Torgeson, (1978; 1979) emphasizes that these inconsistencies and lack of agreement may be untangled through the implementation of a heuristic battery of tests directly related to the reading process itself.

Torgesen and Houck (1980) have suggested that reading disabled children lack the ability and/or inclination to use strategies efficiently and appropriately in tasks which require short term memory (Das, Bisanz & Mancini, unpublished document). Furthermore, it is suggested by Baddely and Lewis (1979) that weaknesses in verbal short-term memory may directly express themselves in poor reading acquisition. These investigators offered the following hypothesis: items to be recalled must be subvocalised and thus the articulatory loop plays a predominant role in remembering and reading proficiently. This relationship between short term memory and reading is paramount, since the exact meaning of words in sentences can only be abstracted upon successfully reading the complete sentence (Doehring et al., 1981; Lashley, 1951). Thus reading disability could involve deficits in short-term verbal memory (Doehring et al.,1981; Shankweiler et al., 1979).

The most generalized hypothesis dealing with short term memory may be best classified as a general short term maintenance hypothesis. Jorm (1979), for example, indicated that dyslexia, either developmentally or traumatically induced, is directly related to, and is a result of the individual's inability to maintain a number of codes or chunks simultaneously in short term memory. Somewhat similar hypotheses have been expounded by Corkin, 1974; Singer, 1979; and by Torgesen, 1978, who maintain that poor readers have difficulty with identifying and maintaining the order of a series of items in short term memory.

A somewhat different explanation has been proposed by Perfetti and Lesgold (1978). The focus of this theory rests on the notion that poor readers are abnormally slow and inefficient not only in the encoding of new items in short term memory but also in 'clearing' old items or irrelevant information from short term memory. This results in overloading and backlogging short term memory, thus interfering with comprehension and slowing down the rate of encoding (hysteresis). This theory, however, fails to specify whether comprehension deficits are a result of short term memory deficits or recoding deficits.

Some theorists consider Comprehension failure is considered to be a result of short term memory deficit and not storage capacity per se. This theory falls short to the extent that Perfetti and Lesgold provide no empirical evidence that codes, in a reading disabled individual, are slow to be cleared as well as being slow in entering short term memory .

An alternative explanation, which is cognitively based, rests upon the child's ability to progressively coordinate several components simultaneously. Furthermore, the new found ability of controlling logical connectives facilitates the interconnection of thoughts which would otherwise remain separate and unrelated.

The brief review of literature on reading disability has documented many diverse factors; however, the most thoroughly researched areas in the field of reading disability are those related to perceptual and language problems. Early studies have been largely concerned with the investigation of perceptual problems; more recent studies propose language-based deficits as explanations of reading disability as well as cognitively based explanations of reading disability (e.g., Carr, 1981; Piaget, 1962).

Language-Based Deficits

Within the rubric of verbal processes such areas as verbal, syntactic, semantic, and phonological processing have been considered. Deficiency in verbal skills has been related directly and indirectly to reading disability. The number of substitutions and pronunciation errors made by the reading disabled child have been used as supportive evidence for a verbal deficiency hypothesis. These difficulties, according to Vellutino (1978), may reflect deficits in both semantic and phonological processing, although he cautions that "the relative contributions and/or interaction of these two functions as determinants of specific types of reading error is unclear"(p.97).

Language can be described as the 'cardinal' agent for reading acquisition. Rabinovitch (1968) emphasizes the inability of reading disabled children in the mastery of a variety of linguistic areas. Specifically, these linguistic deficiencies manifest themselves in expressive language, word endings, and symbolic learning. Similar conclusions were drawn by Ingram and Reid (1956), Ingram, Mason and Blackburn (1970), and Lyle (1970), who all reported a high percentage of reading disabled with a history of language difficulties. These language difficulties can be classified as: verbal processing deficits (Liberman & Shankwieler, 1976); retaining verbal details such as word strings and grammatical markers (Blank et al., 1966, 1968; Kastner & Rickards, 1974); deficits in short term verbal memory for linguistic material (Perfetti & Goldman, 1976); verbal mediation accuracy (Liberman et al., 1971; Vellutino et al., 1972); expressive language (Shulte, 1967); morphological generalization (Berko, 1958; Brown, 1973; Wiig et al., 1973); and phonetic structure of spoken language (Downing, 1973; Mattingly, 1972; and Savin, 1972).

A number of studies comparing semantic encoding and verbal memory in normal and reading disabled populations have revealed an inability on the part of the poor readers to encode linguistic information in working memory (e.g., Perfetti & Goldman, 1976). Poor readers have demonstrated difficulties in employing verbal mediators to assist recall (Blank et al., 1966; Blank, 1968; Katsner & Rickards, 1974), and deficiency in verbal mediation as exemplified by orientation and sequencing errors (Liberman et al., 1971; Vellutino et al., 1972). Poor readers were also observed to demonstrate weakness in word retrieval (Denkla & Rudel, 1976a,b). Similarly, Eakin and Douglas (1971), as well as Perfetti and Hogaboam (1975) have found that poor readers were deficient in "automatized decoding skills".

Several investigators contrasted the ability of the reading disabled with that of normal readers in dealing with both meaningful and novel material. The results indicated that reading disabled children have difficulty with tests involving visual-verbal tasks, but were just as proficient as their counterparts with nonverbal tasks (Steger, Vellutino & Messhoulan, 1972; Vellutino, Steger & Pruzek, 1973; Vellutino et al., 1975d; Vellutino et al., 1975a). Similar findings were obtained by Gascon and Goodglass (1970) and Rudel, Denkla and Spalten, (1976). Thus, it seems that the performance of reading disabled subjects is less adequate than that of normal readers in tasks requiring verbal processing.

Further evidence for linguistic deficiencies can be abstracted not only from reading, but also from the child's writings. Persistent visual discrimination, positional and directional errors are observed. Confusions of words with common graphic representations and acoustic similarity (e.g., b/d; was/saw) are probably due to weaknesses of integration and discrimination of linguistic cues necessary for decoding (Vellutino, 1978). Similarly, confusion with words (e.g., lion, loin) is also viewed as resulting from deficient awareness of meaning and/or grammatical distinctions. Lack of these two functions restricts the number of associations, thus leaving the child virtually unaided in discrimination and ultimately in recall. Stated differently, the child who has these linguistic and discriminating cues readily available to him will expand them with other cues in assisting with accurate decoding; this ability is especially important with minimally contrasting stimuli. More importantly, the ability to use linguistic cues provides the necessary functions to proficiently perceive or understand these stimuli in a variety of different contextual bases including the semantic, syntactic, and phonological aspects of spoken and written language.

Studies comparing reading disabled and normal subjects on various measures of syntax provide added support for the hypothesis that language deficiencies are related to poor performance on reading tasks. Specifically, language problems

> could have an adverse effect not only on reading comprehension and written expression, but also upon the acquisition of word decoding skills, by limiting the number and variety of verbal labels and mediators available for acquiring the (graphic) symbol and sound relationship encountered in learning to read (Vellutino 1978, p. 101).

The effect of language ability on reading is especially pronounced in view of the fact that poor readers have been found to be linguistically unsophisticated; to have a small word pool to draw upon; are weak at drawing abstractions and in substantive use of words; are disorganized and unable to appropriately use grammar and syntax (Vellutino, 1978). Wiig, Semel and Crouse (1973) have suggested that reading disabled children demonstrate a two year delay in acquiring the "basic morphological generalizations", an accomplishment which is generally achieved by age seven in normal readers (Berko, 1958; Brown, 1973). Similar findings were reported by Vogel (1974), who concluded that morphological knowledge is related to reading. "Apparently, knowledge of morphology and deficient reading are significantly related and it is possible that they have a common base" (Vellutino, 1978, p.102). This hypothesis is quite consistent with findings that reported syntactic deficiency in poor readers at the approximate age of seven (Vellutino,1978; Vogel, 1974).

Overall, these findings support the view that poor reader's grammatical deficiency is highly related to reading disability. Findings also revealed that poor readers, in comparison to good readers, are less able to deal with tasks evaluating knowledge of words, syntax, and the ability to use words abstractly. These tasks have often been considered to be measures of meta-linguistic awareness.

The following section will present a brief review of the literature in the area of meta-linguistic awareness.

Metalinguistic Awareness

> A person with command of a language has in some ways internalized the system of rules that determine both the phonetic shape of the sentence and its intrinsic semantic content--that he has developed what we will refer to as a specific linguistic competence (Chomsky (1972b, p.115).

Meta-linguistic development in a broad and general way directs itself to a reflective and conscious understanding of language. Meta-language is language about language (Hjelmsler, 1968, p.156-157). Meta-linguistic knowledge is 'knowledge' about language, or, in other words, conscious understanding of language (Jakobson, 1960, p.356). Meta-linguistic development is "development of awareness of the nature of language" (Desjarlais & Lazar, 1976, p.11). In contradistinction, language development is "the intuitive development of language within an individual" (Desjarlais & Lazar, 1976, p.11).

Chomsky (1972) views linguistic awareness as an abstract system involving a culmination of the internalization of a system of rules in relation to their phonetic and semantic representation. By way of contrast, Cazden's (1972) view, which is more pragmatic, emphasizes that "the ability to make language forms opaque and attend to them in and for themselves, is a special kind of language performance, one which makes special cognitive demands and seems to be less easily and less universally acquired than the language performance of speaking and listening"(p.29).

Marshall and Morton (1978) proposed that language awareness develops as a direct consequence of "fault finding"; that is, detecting any inconsistencies, dysfunctions and to specifically define and interpret particular malfunctions. Consequently, language awareness is interpreted as " a hierarchy of monitoring , control, and repair process " (Marshall & Morton, 1978, p.228). These investigators attributed a 'mystical' monitoring device called EMMA which controls normal language processes as well as detecting language inconsistencies and failures. Disruption of normal language processes is attributed to difficulty with lexical items and/or receiving or perceiving only partial semantic information. Perhaps an example of

Marshall and Morton's concept of an inner monitoring system required to understand language rules is provided by the following exchange between mother and daughter:

> Child: nobody don't like me. Mother: no, say " nobody likes me." Child: nobody don't like me. Mother: no, now listen carefully; say " nobody likes me " Child: oh! nobody don't likes me (McNeill, 1966, p.69).

McNeill points to this example as indicating the "relative impenetrability" of the adult's form of language into the child's grammar. He also posits the fact that children acquire 'tacit' language vis-a-vis parental and adult interactions.

The dichotomization between meta-language and language development is important since both of these concepts are directly related to language. The latter refers to the ability to act while the former encompasses the awareness of the nature of that action (Desjarlais & Lazar, 1976). Since this distinction is often overlooked, language development and linguistic development can become interchangeable terms.

Landa (1974), a Russian cyberneticist, in describing language development, used the words 'mastery' and 'knowledge'. The former denotes "the ability to intuitively perform a series of actions such as conducting an interview or speaking a language", while the latter is described as understanding an "awareness of the formal nature of the process one is employing (Desjarlais & Lazar, 1976, p.12-13). Thus, mastery refers to the expressed ability to use the particular process. This represents language development in a broad and general way. Knowledge, on the other hand, requires understanding without the accompaniment of mastery. Again, in a broad and general way, it may reflect meta-linguistic development. However, Landa's theory (1974) does not suffice since it does not take into account a 'formal level' in which mastery and knowledge culminate and are thus expressed in unison.

At a theoretical level, meta or awareness can be structured and categorized by using two critera; 1) that of implicitness and 2) that of explicitness. The former encompasses those judgements which are borderline in awareness and ethereal in nature, e.g. self correction of speech. This indicates an individual's awareness that a mistake has been made. The latter, on the other hand, is evident in judgments regarding the structure or grammatical correctness of sentences (Gleitman, Gleitman & Shipley 1972). Children, as well as adults, are observed not only correcting their own speech, but also that of others. This direct intervention requires not only evaluation of the task at hand, but also an evaluation of what went wrong. The spontaneous language play of children (Weir, 1962) and the usage of or playing with rhyme and word substitution (Read, 1978) reflects the child's ability to use language as an object of "conscious" activity. Language play also aids in reaching the child's conception of the English vowel system

(Levelt, Sinclair, Jarvella 1978).

Explicit and conscious manipulation of language can also be observed in written language since the acquisition of these skills is accompanied by increased analytical and syntactic capacity (Read, 1978). Perhaps the clearest evidence of explicit language awareness can be drawn from a direct questioning technique (Levelt, Sinclair & Jarvella 1978). This technique provides insight into the child's awareness of the grammaticality of sentences, (Slobin, 1978), the structure and cohesion of sentence parts (Braine & Wells, 1978), the appropriateness of speech acts (Robinson & Robinson, 1977) and the ambiguity of sentences (Hirsh, Gleitman & Gleitman, 1978). The older the child, the more parsimonious and precise the responses will be.

Linguistic awareness, like other forms of development, unfolds in a hierarchical fashion. Clark (1978), in investigating children's reflection of language reports six types of metalinguistic awareness. They are:

> (1) monitoring one's ongoing utterances. (2) checking the results of an utterance. (3) testing for reality. (4) deliberately trying to learn. (5) predicting the consequences of using inflections, words, phrases or sentences. (6) reflecting on the product of an utterance. (Clark, 1978, p.34)

The first inkling of reflective ability in using language is evident at about 1-1/2 to 2 years of age when the child begins to cope with the failure of speech acts by monitoring his/her language (e.g., tone, speech) to be consistent with different types of listeners (e.g., adults, strangers and other children). By three or four years of age, the child is seen to spontaneously correct his own pronunciation, word forms and orders. He will ask for correct pronunciation of words, comment on others' language and pronunciation, play with linguistic units, and attempt to make judgments of linguistic structure and function as well as monitor to make sure the listener has understood the message to be conveyed (Clark, 1978). This process seems to enhance communication skills. Several years later, at age five to six, the child begins developing the ability to make distinctions between "form and meaning" of words, he has a direct intention to verify whether a word or phrase has been understood, as well as an active pursuit to practice sounds, sentence structure and speech styles of different types of listeners.

Exposure to formal instruction in reading and writing forces the child's attention to be focused not on the object designated by language but on the formal aspects of language itself. Research carried out in Russia (Bozhovich, 1981; Morozova, 1981; and Slavina, 1981 cited in J. Downing: unpublished manuscript) indicates that the child's awareness of language bisects and forms two pathways. On the one hand, remnants of concreteness are present, thus causing the child to slip back into object-oriented awareness. For example, in counting words the child can count quite proficiently the words that represent objects. However, he fails to count those words that lack independent meaning (prepositions, conjunctions). On the other hand, the teaching of reading and writing focuses the child's attention on letters and syllables thus permitting the child to seperate phrases in their phonetic constituents. It is only a lengthy process of schooling and development that restores a balance between formal phonetic and semantic set in this activity.

By age seven or eight, children use grammatical nomenclature in defining words (Berthoud-Papandropoulow, 1978). At approximately this age, children's ability to separate "form" and "meaning" and to judge utterances affords them the opportunity to appreciate and make verbal jokes (Hirsh-Pasek, Gleitman & Gleitman, 1978), as well as provide explanations for analogous sentences. It is not until later that the child makes judgements of appropriateness, complexity, form, and can apply rules to new situations as well as analyze language into its units. Perhaps this late expression of judging language is a direct result of the fact that such a task requires an explicit vocabulary for its correct and proper verbalization and application. Along with attaining the new milestones of reading and writing, the individual's ability to discuss the form and function of language is heightened.

Formal teaching equips the child with an impressive array of metalinguistic vocabulary (e.g. subject, verb, noun, adjective etc.) However, one line of evidence provided by Heeschen (1978), seems to negate the hypothesis that formal teaching is closely related to meta-linguistic vocabulary. As evidence, Heeschen discussed the Eipo society which had a strikingly rich meta-linguistic vocabulary despite the fact that it is a very primitive "stone age" culture, as exemplified by their usage of words and intonation when speaking.

Recently, a number of investigators have attempted to associate deficits in linguistic awareness with reading disability (Lundberg, 1978). The findings suggest that reading disabled children perform more poorly on meta-linguistic tasks than normal readers, particularly in the phonological domain. It must be emphasized that the majority of studies, however, have used very young children. Whether this relationship exists with older reading disabled children remains a relatively unanswered question. Furthermore, it is questionable whether phonetic analysis of words may be part of a generic language awareness skill since phonetic analysis is intertwined with and is part of acquiring reading itself. Moreover, tests of phonetic analysis of words measure a specific reading skill and do not require the individual to remove himself from the situation, see through and beyond the external structure of language and analytically judge and/or repair language.

The understanding of language, encompassing both structure and function, has become the focal point of investigations for both normal and poor readers. This topic which is of current interest, relates directly to language awareness or simply knowing about language.

In viewing language as a formal system and emphasizing the understanding and appreciation of its structure and function for both normal and disabled readers, Downing and Leong (1982), postulated two related components, namely: (1) "the need to understand the purpose of reading" and (2) "the importance of understanding the internal structure, ie. meaning of phoneme, a word, a sentence"(p.10). Obviously, a parsimonious and acceptable definition of "meta-linguistic" has not been achieved.

The relationship between meta-linguistic ability and reading proficiency is supported by a growing body of research. During the last number of years, researchers have come to postulate that the child's understanding of language and above all his ability to treat language analytically may be more important to the acquisition of reading than the child's language itself. Read's (1978) appreciation of the relationship between language and reading is reflected by his statement that

> the performance of adapting, manipulating, segmenting, correcting and judging language seems to play an important role in at least three processes: learning to read and write, learning a nonnative language, and responding to social expectations. In short, they have a great deal to do with using language effectively under varied circumstances.

> Whether they are conscious, or can easily be brought to consciousness appears to be of secondary importance (p.66).

Overall, the focal point of meta-linguistic skills seems to hinge upon viewing language as a skill of conscious correction. Speech perception and language learning seem to develop in the absence of conscious awareness; speech is acquired, although more slowly, by retarded individuals (Lenneberg, 1967; Lackner, 1976; Morehead & Ingram, 1976). Moreover, all normal children seem to pass through similar linguistic and developmental milestones in a relatively brief period of time regardless of cultural differences (Brown, 1973; Slobin, 1975), caretaker's style of speaking (Newport, Gleitman, & Gleitman, 1977) and to some extent, the ability to hear (Feldman, Goldin-Meadow, & Gleitman, 1979). This dichotomization between speech and awareness of language is further supported by numerous experimental studies carried out in Russia (Bozhovich, 1981; Luria 1976; Morozova, 1981; Slavina, 1981 cited in J. Downing: unpublished manuscript). Basically, these investigators have reported that young children use, quite spontaneously, words within a framework of grammatical structure. However, they fail to make language the object of their awareness. Language, as a whole, remains lifeless and invisible. The concrete awareness of a child, whose language does not encompass abstract concepts, permits relationships to exist among things but not toward language itself.

A number of tasks have been adopted to identify the importance of meta-linguistics and its relationship to the acquisition of proficient reading. Among the most common are Word Awareness, Interchangeability of Labels, Sentence Ambiguity (interpreting jokes), Phonological Segmentation and Synthesis and Morphophonological Knowledge.

Word Awareness

Perhaps the simplest is Word Awreness. Ostensibly, the task of deciding whether a word is long or short, or whether it makes sense, is not a complex task. This is true regardless of whether complexity is defined as the number of steps required for the solution, if there are transformational requirements, or knowledge requirements. Providing a definition of a word, however, is a relatively more difficult task since it is open ended and abstract in nature.

Piaget (1926) contended that illiterates in Golah (Liberia) demonstrated little awareness of the fact that their language consisted of words; to them the phrase and the sentence were the only real unit. Similarly, preschoolers fail to appreciate the idea that language consists of words and that words consist of different parts and, moreover, that words vary in length. Mattingly (1972), suggests that "Synthesis of an utterance is one thing; the awareness of the process of synthesis is quite another" (p.140). As mentioned earlier, fluid grammatical speech is mastered quite early by the child. However, knowledge of grammatical structure remains relatively elusive. The child uses language without attending to the words themselves. Words remain concrete and almost transparent. During discourse, the main focus is upon the exact meaning of the utterances, bypassing language forms. Polanyi (1963),noted that

> if you shift your attention from the meaning of the symbol to the symbol as an object viewed in itself, you destroy its meaning... Symbols can serve as instruments for meaning only by being known subsidiarily while fixing our focal attention on their meaning (p.30).

This duality or "figure ground" aspect of language proves to be quite challenging for young children. "Learning to read, however, should bring about a major change in the child's meta-linguistic knowledge" (Lundberg, 1978, p.84).

Vygotsky (1962) found that young children experienced difficulty with word awareness and were unable to separate a word from its representational object. Similar findings were reported by Ianco-Warral,(1972), Berthoud-Papandropoulow & Sinclair (1974), Rozin, Bressman and Taft (1974), where four and five year olds were found to be insensitive to word length and thus associated a long word with a big object. Moreover, Rozin, Bressman and Taft,(1974), in comparing younger children (4 years of age) to older children (6 and 7 years of age), demonstrated difficulties in understanding the basic relationship between spoken and written words. Older children (7 to 8 years of age), on the other hand, produced phonologically long and short words regardless of their semantic content.

Downing and Oliver (1973,1974), employing a binary choice method (yes/no), demonstrated that children prior to the age of 8 years are conceptually weak in their understanding of what constitutes a spoken word. Ehri (1975), Holden and McGinitie (1972), and Karpova (1977) have all reported that pre-schoolers are unable to segment meaningful sentences into their component words and, moreover, they have a tendency to ignore function words. The process of identifying and isolating prepositions and conjunctions proved to be quite challenging and was often an insurmountable task (Korpova, 1977). Furthermore, Ehri (1977), using a discrimination task game where kindergarten children had to decide whether a word was silly or not, found that nouns and adjectives were extremely easy to identify and present tense words were more easily detected than most irregular past-tense words. Among the words most difficult to detect were some prepositions (of/at), passive nouns (that/those), quantifiers (each/every) and a verb form (were/was).

These difficulties may have arisen due to a number of reasons, foremost of which is the tendency for children to overgeneralize (Berko, 1958; de Villiers & de Villiers, 1979). Thus "ran" would be conceived of as runned; "gave" as gived and so on. A second interpretation is simply that some words, i.e. past tenses, pronouns, quantifiers etc. have a contextual dependency and in isolation carry little, if any, meaning. This reason is perhaps somewhat transparent since, as Ehri reported, some words were successfully identified by the majority of the children, namely, prepositions and conjunctions (on, from, after, before, over, could, and, because), and pronouns (she, what), and past-tense verbs (went). Ehri (1975,1977) concludes that recognition of words is directly dependent upon the particular words.

Several lines of evidence suggest that word awareness is a consequence of reading acquisition and is independent of age. Ehri (1975), using pre-readers and grade one readers demonstrated that the reading group substantially outperformed the pre-readers in their awareness of words and syllables as units of language. More specifically, pre-readers demonstrated difficulty in abstracting single words out of "meaningful context sentences." One possible explanation offered by Ehri is intriguing:

> it may be that some lexical analytic tasks are troublesome not only because word consciousness is required, but also because the child must violate and analyze good gestalt forms (i.e. meaningful sentences) (Ehri, 1979, p.68).

This study, however, provided no support for the hypothesis that the experience of learning to read provides the "foetus bud" for word awareness and superior lexical awareness.

Noting the methodological problems of Ehri's (1976) study, namely that the age variable could have contributed to these discrepancies, Ehri (1979), conducted an additional study to verify her hypothesis. In this study, Ehri conducted her experiment on three groups: one Grade One reading group and two groups composed of reading and non-reading kindergarten children. A paired associate learning task was used where five orally pronounced words were associated with five highly discriminable visual nonsense figures. Two types of words served as responses; context-free words (nouns and adjectives) and context-dependent words (past-tense verbs, prepositions, and other functors) (Ehri, 1979). Subjects were required to learn one word from each of five form classes. The results revealed that pre-readers required considerably more learning trials than Kindergarten readers and Grade One readers. Furthermore, readers were more proficient at extracting words from spoken sentence context. Ehri concluded "that learning to read rather than age and its correlates is the significant factor accounting for the emergence of word consciousness" (p.69).

The results of the above studies attest to individual variability in word consciousness indicating that pre-readers reveal several difficulties with word awareness of context dependent words. However the interpretation of these results is made rather difficult by a lack of knowledge about the skills which were actually measured by the task. An analysis of the functional requirements of these tasks suggests that they involve many cognitive operations including memory functions. Flavell (1970), in his work on memory development in children, has emphasized that performance of memory tasks is directly related to cognitive ability and motivational variables or, more specifically, the ability to apply certain strategies like rehearsal or mnemonics. Thus, variations in the application of different mnemonic strategies could have partially accounted for the above differences.

In addition, the heterogeneity of the groups could be another source of covariance. The two pre-school groups may have differed in a number of ways: intelligence, socio-economic background, opportunity for experience, parent child interaction, and even ethnic stratification of the sample may have varied. Noting these methodological problems, the interpretation and conclusions made by Ehri must be tentative ones. This is especially noteworthy since a close inspection of the distribution of scores by Ehri revealed a bimodal distribution - a phenomenon noticed by other investigators (Calfee, Chapman & Venezky, 1972). The bimodal distribution of word-discrimination scores clearly indicates that readers are not a homogeneous and closely stratified group typified by word awareness and vice versa. The above findings are also at variance with the Ehri (1975, 1976) portrayal of the hypothesis that word awareness is a consequence or a by-product of learning to read.

Contrary to Ehri's hypothesis, Ryan (1982) has argued that word awareness is a pre-requisite to reading acquisition. Ryan (1982) differentiates between "implicit functional knowledge" of language and meta-linguistic awareness. Word awareness is encompassed in the latter category. Not only is word awareness portrayed as a meta-linguistic task, but Ryan includes the reading process as being part of this "meta" phenomenon. Reading, similar to other meta-linguistic tasks,

> differs from primary speech in that the utterances are isolated from the natural context...not only are the background meaning cues missing, but the very motive for speech, the need to communicate, is absent. For the young child with little ability to apply language strategies where meaning is not naturally and obviously apparent, more explicit instructions and more meaningful reading tasks may be required in order to elicit the appropriate strategies (p.16).

According to Ryan, children of ages four through six years demonstrate a relatively high competence in oral language to the extent that they can combine and recombine words for comprehension and the production of speech. Despite this ability, children between these ages have considerable difficulty in detaching language from its context (meaning) and reflecting upon or analyzing its forms. This meta-linguistic focus (capability process) "requires flexibility and a capacity to decenter from the most salient attribute of message" (p.81). Ryan (1982) suggests that a "general cognitive ability-'executive functioning'-underlies the ability to 'select', 'monitor' and 'revise strategies' in problem solving tasks." (p.81).

Ryan, Mcnamara and Kenny (1977), using first and second graders, and third and fifth grade remedial readers, have provided some evidence for this view. These investigators have reasoned that if lexical awareness is necessary for proficient reading then those children that demonstrate weakness in lexical analytical skills may have trouble learning to read. Their experimental manipulations have revealed a rather strong intercorrelation among various measures of lexical awareness and reading ability. Reading level of younger subjects correlated (all above .57, p<.01) with (a) "their ability to classify auditory sounds as words, non-words and two-words, (b) their ability to identify the one or two words added to a second sentence distinguishing it from the first, and (c) their ability to indicate awareness of second meaning of a word by embedding it in a sentence"(p.81). On the other hand, reading level of the older group (reading disabled) was significantly correlated with the ability to classify auditory sounds as words, non-words, or two-words (r=.69, p<.001), but not with sentence segmentation. Furthermore, the reading disabled group had difficulty with written sentence-segmentation tasks and written cloze tasks. Scores on these tasks were highly correlated with auditory word classification tasks (r above .63). These findings provide some credence to Ryan's hypothesis that poor readers demonstrate weaknesses in meta-linguistic awareness. Nevertheless, these findings do not provide direct experimental evidence that suggests that enhancing meta-linguistic skills would facilitate the process of reading.

In this regard, a rather interesting study was carried out by Berthoud-Papandropoulow (1978). He presented 163 children, age four to twelve, with a number of tasks. Each child participated in at least two experiments. Each elicited response was classified in terms of a general trend and age. Briefly, the results were as follows: Young children (four to five years) focus upon the "tangible elements of reality." In speaking about the sentence to children of this age the following conversation might develop: sentence "six children are playing." question, "how many words?" answer, "six." question, "what are those words?" answer, "me, my little brother, and Christianne, Anne, Jean, etc." By age seven, articles and other functors begin to be included in the classification of words and by age eleven they become part of the repertoire of the definition.

From the above review, Word Awareness appears to be a reasonably good candidate for evaluating meta-linguistic abilities. It requires the individual to look *at* and evaluate language. Thus Word awareness is a logical candidate for testing the limits and power of current methodology and theoretical concepts in identifying sources of performance differences between reading disabled and normal readers. If a sound understanding of words cannot be attained it is unlikely that a sound understanding in more complex reading or reading related tasks can be achieved.

Interchangeability of Labels

Piaget (1959) has postulated, in reference to children's responses to nominal realism questions, that children's difficulty with these types of questions is directly related to their belief that words are "consubstantial" with their referents, or the "invisible" attribute of the object. Similarly, Vygotsky (1962) reported that children believe that words are part of or at least related to the object they denote. This notion was extended to children's names by Scarlett and Press (1975) with similar results to those found by Piaget and Vygotsky. This investigator believed that the weakness of young children (4 yrs. of age) in answering nominal realism questions is directly related to their inability to meet the cognitive demands of the task. By way of contrast, older children's (7 yrs. of age) weakness is accounted for by two meta-linguistic domains: phonological awareness (Mattingly, 1972), and a newly developing referential view of meaning. Simply stated, the 7 year old's difficulty stemmed from their new budding conceptualization of meaning. This seems quite consistent with Berthoud-Papandropoulou and Sinclair's (1978) work. For example, seven year olds could proficiently answer, after imagining the disappearance of the referent, that a word still existed. However, they had greater difficulty in responding to the question of whether or not the word had essentially the same meaning as when the referent was present.

The ability to see through words and appreciate their existence in their own right, regardless of the presence or absence of their referent, is measured by such tasks as 'Interchangeability of Labels'. For example, can one call the "sun" the "moon"? The child must provide justification for his answer as well as providing an example of 'what would night look like'?

These tasks have been used previously as measures of meta-linguistic awareness with bilingual and unilingual school children (Cummings and Mulcahy, 1978); and with young children (Osherson & Markman, 1975). It is reported that the ability to perform proficiently in these tasks requires the child not only to use language as a code for reality, but also "he must be able to regard language independently of the reality it refers to" (Osherson & Markman, 1975, p.213). Thus, the child must view and reflect upon language as an independent component of the reality to which it refers. In other words, the tasks encompass the ability to stand back and look at language, rather than through it as though some transparent object.

In summary, the literature reports two major findings: first, young children fail to appreciate the arbitrariness of the relationship between words and their referents (Piaget, 1959; Vygotsky, 1962); second, children find perceptually immediate events compelling (Bruner et al., 1966; Piaget, Inhelder and Szeminska, 1960). Thus, it may be possible that they find some linguistic structures less salient.

From the above, Interchangeability of Labels also appears to be a good candidate as a measure of meta-linguistic abilities. Interchangeability of Labels also requires a firm understanding of language and it's grammatical composation. That is, it requires the individual to think about the language he/she uses unconsciously everyday to communicate intentions and abstract meaning from other's utterances. Similar to Word Awareness, Interchangeability of Labels requires a sound understanding of words in order to understand and perform such a complex task as reading proficiently.

Classficatory Judgments and Ambiguities

In a series of experiments (Marks & Miller, 1964; Miller 1962; and Miller & Isard ,1963), which focused directly on language perception and recall, it was demonstrated that well-formed sentences were considerably easier to memorize and detect (under worsening conditions) than ill-formed sentences. These results reflect the subject's perceptual ability to grammatically classify a series of word strings. Nevertheless, results from Maclay and Sleater's (1960) experiment revealed that Miller's results were not as clear cut as first thought. These experimenters queried their subjects about grammatical classification of sentences. Surprisingly, three out of twenty-one subjects reported the sentence - "label break to be calmed about and"- grammatically correct. Surely, the undergraduate students who served as subjects did not speak in incomplete sentences yet they were unable to detect them easily in utterances. It seems that not everyone is able to focus upon specific syntactic anomalies nor correct those anomalies even when in control of the construction during an ongoing conversation.

The amount of research directly related to the study of people's understanding of sentence ambiguity has been surprisingly small. Some studies have focused upon the adult's understanding of sentence ambiguities (Foss and Hakes, 1978; MacKay, 1966; MacKay & Bever, 1967). Mackay and Bever focused upon sentential ambiguity as defined by transformational grammar, (e.g. lexical, surface and underlying structures), whereas Foss et al, and Mackay focused on comprehension of ambiguous sentences. Foss concluded that "listeners immediately compute only one structure and meaning and maintain it unless further input necessitates a change or recomputation of the sentence structure and meaning" (Foss and Hakes, 1978, p.304). This refutes the notion that all structures and meanings are simultaneously and immediately processed and analyzed, and involve making a subsequent choice. These early studies have revealed the fruitfulness of investigating adult comprehension of ambiguous sentences. Children's research has been rather scant not only in investigating the specific development of the skills involved in understanding that a sentence is in fact ambiguous but also at what point in their development are children capable of understanding both readings of an ambiguous sentence.

We encounter ambiguous sentences countless number of times throughout the day. Nevertheless, these ambiguities, for the most part, go unnoticed. An example is the possible ambiguity of "I took his picture." Downing and Leong (1982) suggests that "ambiguities must be dealt with by the normal language routine. It is likely that all meanings of ambiguous words are accessed, transferred to working memory and evaluated for some kind of goodness of fit"(p.46-50). The adroitness in dealing with ambiguities reflects a developmental phenomenon.

Hirsh-Pasek, Gleitman and Gleitman (1978) and Shatz (1972) asked children of five to seven years of age to detect and comment about analogous sentences. These investigators found that five year olds were able to detect and report "implausibilities and meaning anomalie in sentences." For example, "the colour green frightens George", was rejected as a sentence simply because "greens don't have faces of paint." or "boys are used to green." However, syntactic violations which do not distort the sentence dramatically went unnoticed: " John and Billy is a brother". By way of contrast, seven year olds usually found semantically odd sentences as appropriate or acceptable (ie. "the colour green frightens George") while acknowledging the semantic implausibility of "it doesn't frighten me", they went on to consider the structure of the sentence: "but it sounds o.k.".

Overall, the above findings reveal that surface structure anomalies are outside the grasp of the five year olds. Nevertheless, these children are quite proficient in dealing with meaning anomalies. Judgments for both meaning and form become more salient to the seven year old. Similar findings were obtained for tasks requiring detection and reporting of ambiguities in jokes presented orally. More specifically, ambiguities which 'turn' on word meaning (e.g., two meanings for the word 'bark') or underlying structure (e.g., 'we're going to have my grandmother for Thanksgiving') posed little difficulty for any of the forty-eight subjects whose ages ranged from six to eleven years. In contradistinction, phonological deformation and segmentation ambiguities (you ate ten pancakes? how waffle?) and (where would you go to see a man eating fish?) provided the greatest challenge for all age groups. Furthermore, these types of ambiguities revealed a high degree of symmetry of inaccessibility for the youngest subjects

(Hirsh-Pasek, Gleitman & Gleitman, 1978). Similar findings have been reported by Fowles & Glanz (1977) and Kessel (1970).

Mackay and Beaver (1967) ascertained, irrespective of the lack of empirical evidence, that surface structure ambiguities were accessible at an earlier age than deep structure ambiguities. This hypothesis was substantiated later by Shultz and Pilon (1973). Their findings also suggest that phonological ambiguities were considerably more salient than lexical ambiguities, while different types of syntactic ambiguities unfolded at the approximate age of twelve years. A possible explanation for the facility in dealing with lexical over syntactic processing is simply that lexical items could be processed prior to analytical syntactic structure being completed (Leong, 1982).

The evidence that phonological processing is more salient than the lexical processings is at variance with the notion that sentence comprehension involves the progressive understanding of underlying structure to surface structure and finally to lexical items (Downing and Leong, 1982). Exemplifying this notion is that both English and Japanese children learn the deep structure of the language first and subsequently surface structure (McNeill, 1968). Kessell (1970), in an investigation of lexical, surface structure and deep structure ambiguities using kindergarten, first, second, third and fifth graders found that lexical ambiguities were comprehensible at an earlier age than surface and deep structure ambiguities. Moreover, it is interesting to note that Kessell reported a qualitative change in the subjects' responses at about age twelve. "Within those children detecting the ambiguities, a marked difference exists between the fifth graders and all younger children in what might be termed explicit awareness of the ambiguities. Thus for the surface structure ambiguities, the fifth graders spontaneously made comments such as 'you can put it differently...' (Kessel, p.45). While Kessel found meta-linguistic skills develop as a function of age, the results, nevertheless, revealed a great deal of variability of subjects' responses; some seven year olds outperformed some ten year olds in detecting ambiguities. Similar findings were reported by Brodzinsky (1977), and Fowler and Glanz (1977). Thus, Kessel's study, in addition to those of other investigators, clarifies the nature of the comprehension processes and provides some insight into understanding language development in children.

Classification of sentences and explaining ambiguities requires a conscious reflection of language as an object (Hirsh-Pasek, Gleitman & Gleitman, 1978). Speaking and understanding, on the other hand, require no such reflections. Reflective skills develop later in life and mirror greater variability in the population than does language perception and the art of speaking. For example, an individual may be able to repeat and detect phonological identities (e.g., age as a morpheme or as a syllable embedded in personage), but provide absolutely no evidence of "knowing that they know" about phonological identities.

Overall, the development for judging ambiguities unfolds later in the individual's life span, reflects individual variations and is sensitive to the language level that is being tapped. The delayed onset of judgmental responses for ambiguities is perhaps a result of "interpretive bias" for particular sentences and situations. This bias can be partially overcome by a verbal joke format, hence the joke provides an exceptional format for investigating children's appreciation and management of ambiguities.

Children from the North American continent seem to be at ease when dealing with verbal jokes; consequently, this format could be regarded as an exceptional format to grasp children's ability to deal with ambiguities. A number of investigators have used this technique to study the domain of ambiguity recognition (Brodzinsky, 1977; Fowler & Glanz, 1977; Shultz & Horibe, 1974). People tend to find ambiguity in jokes quite easy to appreciate and understand. It seems that jokes, because of their contextual clues, first bias the individual in one direction then suddenly force a switch to the opposite direction. It is this forced switching from the "set up" interpretation to the "punch-line" interpretation that arouses the individual and makes the ambiguity more difficult (Fowler & Glanz, 1977; Hirsh-Pasek, Gleitman & Gleitman, 1978).

A number of investigators have found that young children, seven and eight years of age, appreciated riddles turning on syntactic humor (Fowles & Glanz, 1977). Riddles with syntactic ambiguities were enjoyed by age nine (Brodizsky, 1977). Hirsh-Pasek, Gleitman and Gleitman (1978), employing jokes turning on different sources of ambiguities - phonological, lexical, surface structure, deep structure, morpheme boundary with no phonological distortions and morpheme boundary with phonological distortions - investigated the performance of good and poor readers in dealing with ambiguous jokes. The subjects were selected from grade one to grade six on the basis of teacher's evaluation of their reading performance. It must be emphasized, however, that good readers were above the national norm in reading performance and poor readers were average readers in terms of the same national norms. Performance, as expected, was better for the older group than the younger group and, interestingly, superior readers were considerably more proficient in dealing with jokes than poor readers. An hierarchical order of difficulty was also found. Specifically, ambiguities of lexical interpretations and underlying structure were considerably more easy to appreciate than ambiguities that turned on phonology and surface structure.

A host of findings purport that classificatory judgments are more conspicuous at an earlier age for deeper and more meaningful aspects of language than are surface structural properties (Marks and Miller, 1964; Maclay & Sleater, 1960; Miller, 1962; Miller & Isard, 1963; Shatz, 1972). Downing and Oliver (1973,1974) have demonstrated that five year olds can easily acquire the concept of "word" and "sentence". Nevertheless, these five year olds have mild difficulty with the segmentation of speech into words (Holden & MacGinitie, 1972), and more difficulty in segmenting words into syllables (Liberman, Shankweiler, Fischer, & Carter, 1974; Rosner, 1974), culminating with the highest difficulty in dealing with the segmentation of words and syllables into phonemes (Elkonin, 1973; Rosner & Simon, 1971; Rozin & Gleitman, 1977). These difficulties do not seem to stem from weaknesses in language perception, since four week old infants can discriminate phonological entities in speech sounds (Eimas, Siqueland, Jusczyk & Vigorito, 1971). It seems that the acoustic apparatus of speech discrimination is available at a very early age. Nevertheless, reading disabled children and very young children (five years of age) seem to persistently fail the auditory discrimination test (Wepman, 1958), a test which has been reported to be highly correlated with reading readiness. Nevertheless, these children who cannot make the necessary judgment of same or different can correctly repeat the stimuli (Blank, 1968). They can also provide the appropriate judgment when the task is visually presented (Smith, 1973). It seems, therefore, that weaknesses are only evident when requiring the child to make a judgment about the sounds of linguistic stimuli. Since the Wepman test is a relatively high predictor of reading success, it could be hypothesized that this judgmental faculty is related to proficient reading.

Rozin and Gleitman (1977) have argued rather stringently that conscious awareness of surface language and not meaningful content provides a barrier towards the acquisition of proficient reading. Firth (1972) has demonstrated, using grade three students matched for I.Q., that poor and normal readers were indistinguishable in their performance of anticipating possible endings of incompleted sentences (a semantic task). These two groups, however, became quite distinct when asked to provide a consensus response for nonsense words (e.g., nide or prit) - the reading disabled group fared poorly. Similar findings were reported by Gleitman and Rozin (1977), Rozin and Gleitman (1977), who attempted to teach poor and good readers a logographic (morpheme) script, a syllabic script and an alphabetic script. Poor readers had the greatest difficulty with the alphabetic script, less difficulty with syllabic script and least difficulty with morpheme script. These investigators concluded that "the essential difficulty for poor readers seems to be in accessing their phonological machinery"(p.103).

In summary, the ability to deal with tasks which require conscious recognition and manipulation not only develops later than the perception of speech and language but also provides the greatest challenge to both children and adults. Unlike speech, which develops rather uniformly, awareness of language is most elusive as reflected by the degree of variability in its development. This variability may be related to the type of task adopted to measure meta-linguistic awareness. Finally, judgment access is easiest for fully processed sentences and most difficult for lower level sentences (syntactic and phonological).

From the brief review of literature presented above, Sentence Ambiguity seems to be a logical candidate as a measure of meta-linguistic awareness. This task requires the individual to look *at* language and be aware of words in an abstract fashion. It also requires a firm understanding and awareness of the grammatical composation of language.

Overall, Word Awareness, Interchangeability of Labels and Sentence Ambiguity are considered important tasks to test the limits of current methodology and theoretical concepts in identifying sources of performance differences between reading disabled and normal or superior readers.

Alternative Tasks Used as Meta-linguistic Measures

A number of tasks have been adopted to measure meta-linguistic awareness. The most commom task adopted to achieve this end is phonological segmentation and synthesis. Morphophonological knowledge has also been referred to, as a measure of meta-linguistic awareness. The following brief discussion will focus on the above tasks.

Auditory Phonological Segmentation and Synthesis

It was previously stated that a child's language by seven years of age becomes more abstract. These linguistic, changs at the ponological level, assist the individual to perceive linguistic units within utterances. This new ability of segmenting utterances into words, syllables and phonemes is directly related to reading acquisition. In fact a number of studies have indicated that the ability to segment written words into their phonological components is a good predictor of reading performance at an early age (Flood and Salus, 1982). Furthermore, the importance of word awareness in print and, speech speech awareness of word segmentation relates highly to reading achievement (Calfee, Venezky and Chapman, 1969; Ehri, 1975; Holden and MacGinitie, 1972; Liberman, 1980). These findings have lead a number of investigators to describe this ability to phonetically segment and synthesize words as "metalinguistic awareness" (Read, 1978) and "metacognitive awareness" (Sinclair, Jarvella, and Levelt, 1978).

From the above, it would appear that Auditory Phonological Segmentation and Synthesis may be a good candidate as a measure of meta-linguistic awareness.

Morphophonological Knowledge

A number of investigators (e.g., Liberman, 1980) have postulated that a relationship exists between oral language ability (e.g., morphophonological knowledge) and reading. The application of morphophonological rules is related to reading since written words mirror morphophonemic structures in complex ways (Chomsky and Halle, 1968; Chomsky, 1970; Venezky, 1970).

Flood and Salus (1982) argue that if reading requires meta-linguistic awareness, that is, becoming aware of the categories and relations in language, then "awareness of structural-relational knowledge must also play a role in reading development" (p.60). Knowledge of structural-relations may be a pre-requisite to morphophonological *awareness* for at least those individuals who use a top-down strategy in learning to read.

From the above, morphophonological knowledge has been indirectly related to meta-linguistic awareness. Thus, it may be possible to classify morphophonological knowledge as a possible task to measure meta-linguistic awareness.

Morphophonological Knowledge and Auditory Segmentation and Synthesis tasks are not specifically designed to eveluate the individual's awareness of language. Nevertheless, in some way they do examine language awareness. That is, they require the individual to think about some aspect of language that he/she uses unconsciously every day to convay intentions and to understand intentions conveyed by others. In all of these instances the individual is required to bring knowledge of language categories or relations into some level of conscious awareness. As such, these tasks may be described, to some degree, as being meta-linguistic awareness tasks. However, they lack the generic language component that requires the reflection and analyzation of the global aspects of language which enables the individual to "confirm, modify or add to hypotheses about the structure of language" (Flood and Salus, 1982, p.60). Furthermore, Morphophonological Knowledge and Auditory Phonological Segmentation and Synthesis skills are more related to instruction as they are specifically taught and imparted as a result of direct instruction. Thus, they are better measures of evaluating specific skills learned as a consequence of instruction. Thus, Auditory Phonological Segmentation and Synthesis and Morphophonological Knowledge tasks are not considered to be pure measures of meta-linguistic ability.

Relationship Between Meta-linguistic Ability and Reading

> Why is that a child who knows the characters and their sounds still cannot read the word or syllable they compose? This strictly speaking is the riddle of the reading process..... One could demonstrate that the entire history of methods of teaching reading is one of hypotheses about this riddle

(Elkonin, 1973a, p.571)

Young children have been described as being competent listeners and users of speech. They can differentiate the sounds of their language and distinguish words on this basis. However, a pre-schooler is yet unable to not only distinguish all of the seperate sounds embedded in a word but also to distinguish the sequential order of these sounds in a word. They lack the systematic awareness of their linguistic abilities (Egorov, 1953; Elkonin, 1971; Luria, 1981, cited in J. Downing, unpublished manuscript). In Luria's terms language is a "glass, through which the child looks at the surrounding world, not making the world itself the object of his awareness, and not suspecting that it has its own existance, its own aspect of construction" (Cited in Downing, J. 1981).

A rather dramatic change occurs in the child's linguistic development as a result of formal instruction in reading and writing (Downing, 1981). The child's attention is focused away from the concrete aspects of language and is directed towards abstract sounds and letters which are directly related to a structural system of language. During the acquisition of reading and writing skills, and through exposure to the formal teaching of the grammatical aspects of language, words are at first enveloped by their material and sensory nature. It is only through a slow process that words become the object of the child's attention and ultimately his awareness. At this point, words are no longer associated with a particular or specific referent but become part of the system of language. Moreover, the child begins to understand and become aware of the phonetic system of language by his reconstruction of his phonetic hearing. The child becomes aware of the speech units and their temporal order. This imposes considerable demands on the individual's analytic and synthetic processes. The child then becomes aware not only of words but also of their sound composition. All of this, begins to foster the child's awareness of the linguistic act as well as developing a clearer understanding of the task of reading.

Competent use of language requires the application of a repertoire of knowledge encompassing the rules of semantics, syntax, phonemes and morphemes and for written language, the knowledge of the graphic system. In addition, language proficiency requires not only a firm knowledge of semantic categories such as "agent, experiences, action, possession, dative, attribution, location and object" (Bryen 1981, p.30),but also an awareness and ability to manipulate and represent these categories in a multitude of ways. For example, the word "car", depending upon the context in which it is used, may refer to any car, or to a car with some specific attribute. This ability or flexibility in the use of symbols is highly related to proficiency in the use of language. Furthermore, the language user must also be cognizant of the rules which govern the combination of these categories into "semantic relations: e.g. agent - action -

dative - object - locative (mother gave John lunch in the garden)" (Bryen, 1981, p.30).

Proficiency in dealing with semantic relationships is dependent upon one's knowledge of semantic characteristics of particular words. For example the following two sentences "the boy likes the girl", "the chair likes the girl" are grammatically correct. Nevertheless, the latter sentence lacks meaning and is thus unacceptable, since the word "like" is associated with "animate" relations ~~and~~ becomes incompatible when associated with an "inanimate" object such as a chair (Bryen, 1981). In addition to understanding and actively manipulating semantic characteristics of words, the individual must also be aware of grammatical morphemes such as articles, auxiliary verbs, prepositions and suffixes. Their main function is to control the meaning of a particular semantic class. For example "a boy" signifies any boy while "the boy" is representative of a specific individual.

Using language proficiently also requires competence in manipulating "semantic relations" into a variety of sentences, for example, statement, negation, question, command. In addition, individuals must also be able to combine two separate propositions into one sentence, for example:

Give me the paper.
Give me the pencil.

Give me the pencil and paper.

As well as imbed one proposition into another, for example:

The boy is young.

The boy played in the park.

the young boy played in the park. to form a sentence (Bryen, 1981)

In addition to learning and applying the rules which dictate the meaning of language, the individual must develop an awareness of the "pragmatics" of language. The simultaneous awareness of oneself as a sender and participant in a physical and social context and, a sensitivity of the listener's perspective and context are required. This process of decentration takes into account "coding" and "recoding" information (the intended message) for the listener.

The first dramatic occurrence of language development and language awareness is made evident by the dichotomization of words from their referents. Following a Piagetian paradigm this development unfolds and is paralleled by the concrete operational stage. The contemporaneous development of these processes may suggest a definite relationship or dependence on one another. Indeed, it is not the exception to the rule that this linguistic awareness precedes the concrete operational stage. It is uncommon to witness the opposite (Desjarlais & Lazar, 1976). To suggest that linguistic awareness preceds cognitive development is to say that cognitive development may be dependent on linguistic awareness. This is felt to be an unwarranted assumption. Desjarlais and Lazar (1976), postulated that these two processes emerge independently of each other as offshoots of some third underlying process which precedes both; however, these investigators fail to mention or to specify this third dimension.

The unfolding of more complex language awareness skills, where words are viewed as linguistic wholes, has not to date been associated with cognitive development. However, linguistic knowledge abstracts functional meaning from its association with general cognitive structures. Reading is related to general knowledge through linguistic knowledge. Reading and language are interconnected by decoding and encoding skills. In addition, printed language is visually connected to the structure of language; that is, "knowledge of written material is connected to knowledge of the sound aspects of language" (Furth, 1978, p.50). This process, according to Furth, is adopted by young readers. However mastery of reading precludes the verbal translation of material and proceeds directly from reading knowledge to linguistic knowledge.

Results of investigations in the United States and Russia have revealed a striking relationship between cognitive development and reading disability. For example, Tsypina (1974) maintains that cognitive problems are not due primarily to insufficient practical knowledge, but rather a disability in voluntarily "representing" that which is known. Representational competence is inextricably related to the proficiency of using symbolic systems--e.g., language.

Reading disabled children have been found to function at a preoperational level, using figurative aspects of thought rather than operative thinking (Klees & Le Brun, 1972). Pursuant to the above information, it is not surprising that language difficulties can pose considerable problems in reading. For example, the transformation of a sentence into an interrogative or imperative form, using a passive tense, necessitates a rather complex mental operation "from the base structure to the respective transformed surface structure" (Bryen, 1981, p.42). Thus reliance on figurative thought hinders the successful manipulation of complex structures requiring a number of manipulations to be performed. While these investigators studied a population with generalized reading disability, others have focused upon the specific inter-relationship between language and reading.

Reading has been described as a "psycholinguistic guessing game" in which the readers sample only a minimal number of visual signals, relying heavily on the redundancy of language to predict structures" (Gerber, 1981, p.93). Consequently, it is reasonable to suggest that the process of reading requires the reader to utilize his knowledge of language and the world. Thus, weaknesses in the linguistic system would be directly translated to difficulties in reading. For example, ineptness of word retrieval in spoken language would mirror a disability in reading, since "reading like picture naming requires ready elicitation of spoken equivalents" (Jansky & de Hirsh, 1972, p.40). Similarly, syntactic deficiency has been related to disability in reading comprehension since "meaning is conveyed primarily through the systematic structure rather than individual words" (Vogel, 1975).

Denner (1970) and Farnham-Diggory (1967), in investigating the relationship of syntactic ability and reading, presented their subjects with groups of 3 logographs and required them not only to cut out the sentences composed of these logographs, but also to perform the appropriate responses. The results revealed that the reading disabled experienced considerable difficulty in translating and synthesizing the meaning of the sentence as a whole, an operation which develops between the ages of 6 to 9. These children consistently attempted to perform the act of each logograph, (e.g., "block", "jump", and "over" instead of "jump over block"). Denner (1970), reports that the inability to synthesize the logographs into a meaningful string of words was directly related to syntactic incompetence. Furthermore, Denner (1970) suggests that "these children do not read sentences, but a series of individual words, and the sentence meaning is some conglomerate of individual words rather than a unified contextual conception." (p.882). Wallach (1978), characterized this phenomenon as the inability to "hold together grammatical frames and abstract meaning from larger contexts" (p.181). This difficulty occurs largely due to inappropriate understanding and misapplication of linguistic rules and strategies which are important in language comprehension and more specifically, reading. Thus, reading can be described not as a purely perceptual act, but as a "language-based activity" requiring the orchestration of both knowledge of language and the world.

It is rather interesting that a number of investigators have come to believe that reading requires a linguistic awareness of greater magnitude and sophistication than that required for speaking. This awareness reflects a high degree of variability within the population (Mattingly, 1972; Shankweiler & Liberman, 1972). Gerber(1981), maintains that

> it is highly possible, although not as yet thoroughly researched, that part of the learning disabled child's deficits lie not solely in his linguistic systems themselves, which functions out of awareness, but in the inadequacy of this secondary linguistic awareness or what might be labelled meta-linguistic skills" (p.93).

This argument is convincing when consideration is given to the phonological domain and to the phonetic skills of word segmentation which, according to Kinsbourne and Coplen (1979), "calls for an analytical listening attitude and requires deliberate effort" (p.123). Vygotsky (1962), claims that "consciousness and control appear only at a stage in the development of a function, after it has been used and practiced unconsciously and spontaneously." (p.43) Thus, it seems reasonable to assume that language may be conceived of as functioning at different levels of complexity and that language and reading are related. Furthermore, it may be argued that a necessary condition for proficient reading is the existence of language awareness or meta-linguistic awareness.

Developmentally, linguistic awareness unfolds after the individual has learned to speak and understand. It is also highly related to the type of linguistic representation that is required to successfully perform the task. That is to say that deep representations are easier to access and report than are less - processed (superficial) representations since the latter restrict conscious reflection.

The emergence of meta-linguistic awareness being relatively late in comparison with language development (Dale, 1976; Mattingly, 1976; Slobin, 1978), coupled with the inconsistencies and variability with which it is found in adults, underscores the notion that meta-linguistic awareness may not be directly connected with early language acquisition.

Reading, unlike language development requires bringing meta-cognition into conscious awareness. Reading, in a similar fashion to meta-linguistic awareness, is variable and inconsistent within individuals. Moreover, reading is also wholly 'responsive' to the type of script; scripts that are represented by 'deep representations' are easiest to appreciate and learn since they facilitate conscious reflection.

According to Mattingly (1979), meta-linguistic awareness is directly related to the ability to access the "individual's knowledge of the grammatical structure of sentences" (cited in Downing and Leong, 1982, p.98).

The relationship between reading and meta-linguistic awareness, according to Mattingly (1980), is directly related to the degree with which the individual has actively pursued language learning. This quest would lead the individual to acquire greater grammatical knowledge and thus render reading easier.

This hypothesis at first glance seems reasonable since, failure to utilize language and to strive for greater linguistic goals would weaken one's facility to use the particular linguistic awareness skills. However, Mattingly (1976), also suggested that those children who fail to "pursue language acquisition beyond what is needed for ordinary usage, their language awareness will atrophy and that this is likely to make it difficult for them to learn how to read" (cited in Downing and Leong, 1982, p.100).

Bever (1975), emphasizes that grammar does not wither away since it is well entrenched in the individual. According to Bever, grammar becomes "epiphenamental" to comprehension (e.g., I understand what you are saying in spite of the fact that your grammar is terrible). Grammar is required to understand not only what you are saying and reading but also to understand what other people are saying. Moreover, it is felt by the writer that the primary stumbling block for young children learning to read is that grammar is only implicitly known and often inaccessible.

A somewhat similar phenomenon has been reported with respect to language. deVilliers and deVilliers (1979); Gleitman, Gleitman and Shiply (1978); Hirsh-Pasek, Gleitman and Gleitman (1978); and Kessel (1974) have reported that children of three and four years of age are vertually unconversant with respect to reporting grammatical ambiguities. For example, children who say *Claire and Eleanore is a sister* will in fact report this sentence to be grammatically correct. This seems to indicate that speech and understanding appears early in life while ability to judge grammaticality appears later. Furthermore, it contradicts Mattingly's position that access, intuitively present, is observed at an early age and is part and parcel of language awareness. Paranthetically it is difficult, at this time, to make blanket statements suggesting that children are all grammar and no processors, while adults are all processors and no grammar.

In summary, meta-linguistic awareness, the ability to think, reflect and comment upon language, develops rather late in comparison to language acquisition.

The ages of two to six witness the following developments in language awareness:

1. Self correction and rephrasing in the course of ongoing speech.

2. Comments on the speech of others, for example: pronounciation, dialect, language, meaning, appropriatness, style, volume, etc..

3. Explicit questions about speech and language.

4. Comments on own speech and language.

5. Response to direct questions about language.

(Slobin, 1978, p.45)

A review of recent literature in the area of reading disability reflects a change of attitude and focus in this area. The traditional question of 'why can't Jimmy read'? has been overridden or at least modified to ask: 'why can Jimmy read'? This reflects an intensified concern for the capacities and skills required for reading, and, most importantly, how the awareness of these skills may be related to the acquisition of reading proficiency.

In recent years, investigators have attributed language problems to reading disability. Most studies in this area have taken their inspiration from the classical work of Shankweiler and Liberman (1972; 1976). On the basis of a number of investigations, they conclude that poor readers lack awareness of the phonetic structure of both spoken language and printed words, and that they have a marked weakness in engaging the necessary phonological "machinery" for storing information in short term memory. Studies in meta-linguistics have recently provided a different perspective in attending to the problem of reading disability. Considerable attention has been given to understanding the development of children's linguistic and communication skills. However, little research has been directed toward the understanding of the child's progressive awareness of language as "language".

Research in the area of meta-linguistic awareness has basically focused on young children and has utilized a variety of tasks. However, no systematic attempt has been made to investigate the relationship between these tasks, nor to scrutinize these tasks to determine whether indeed they conform to the definition of meta-linguistic awareness (such as in the case of phonological segmentation and synthesis).

In addition, investigators have hypothesized the relationship between meta-linguistic awareness and reading acquisition or reading proficiency (Ehri, 1979; Mattingly, 1976). These hypotheses have been proposed in the absence of research and empirical substantiations. Thus there is a need to investigate the area of meta-linguistic awareness within an older population, with normal and reading disabled children, as well as to investigate the efficiency and relatationship between the tasks used as measures of meta-linguistic awareness. This method might assist in understanding the variability of results found in numerous studies.

III. RESEARCH DESIGN AND METHODOLOGY

Rationale for the Study

The following section describes the rationale, the hypotheses to be tested, the sample, the experimental procedure, and finally the definition of the dependent and independent variables.

Research has indicated that reading is closely related to a number of linguistic and non linguistic factors (Gibson & Levin, 1975). Few investigators have addressed the relationship between developmental changes, language development and reading acquisition (Doehring, 1976; Fletcher, 1981; Gibson & Levin, 1975). Torgesen (1975) has emphasized studying developmental changes in reading disability because " studies using subjects at one age may identify deficits associated with reading disability which are different from those found in other ages" (p.421). Furthermore, the study of age-dependent relationships would provide additional flexibility in interpreting behavioral correlates of reading and learning disability (Fletcher, 1980).

Until recently, one aspect of reading disability which had not received much attention is the knowledge individuals possess of their language. The survey of literature presented earlier suggested the need for more research not only with average readers but also with reading disabled youngsters. Two aspects of meta-linguistics that need to be thoroughly researched are: (a) the relationship of tasks which have been commonly used to measure meta-linguistic abilities, (b) the relationship of meta-linguistic awareness to the acquisition of proficient reading skills for both normal and reading disabled children. Hence, this study proposes to investigate meta-linguistic skills of both normal and reading disabled populations.

In an effort to examine their abilities, subjects were administered a variety of tasks measuring different components of meta-linguistic awareness, skills related to reading acquisition, and reading ability (decoding and comprehension). Willows and Ryan (1981) suggested that studies dealing with comparisons of reading skills should endeavor to control comprehension skills among good and poor readers with probable differences in decoding ability. This, according to these investigators, can be achieved by controlling for decoding skills. In view of these recommendations, subjects were selected on both decoding and comprehension skills utilizing the Elementary Reading Test (1980), administered by the Edmonton Public School Board.

A second component which research in reading disability has failed to control, is the age variable (Torgesen, 1975). Children of different ages are often found within a classroom or reading group. Thus, if meta-linguistic skills are related to age and experience, then the heterogeneity of the group will reveal inconsistent results.

Thirdly, reading is related to intelligence (Singer, 1974). Thus, it is important to control not only for age but also for intelligence. The normal and reading disabled subjects chosen for this study have comparable intelligence levels. The IQ measures were taken from the Canadian Cognitive Ability Test administered by the Edmonton Public School Board.

Research in the area of meta-linguistic awareness has utilized a number of tasks purported to measure meta-linguistic abilities. However, the issue of whether these tasks actully measure the same thing has never been addressed. Thus, one primary focus of this study is to determine the relationship between a variety of so-called meta-linguisyic tasks and the degree to which these tasks all measure some common construct.

A econd major purpose is to determine the degree to which different reading populations utilize meta-linguistic abilities and/or specific skills related to reading at two different age levels. As short term memory has been consistantly found to be highly related to reading, the relationship of this skill needs to be evaluated relative to both the meta-linguistic tasks and specific reading skills tasks. Therefore, in the context of this study short term memory tasks were utilized to explore this relationship.

Definitions

Meta-linguistic Awareness: Meta-linguistic Awareness may be best described as the competency and/or ability with which one is capable of reflecting upon language by seeing through and beyond the external structure of that language. In other words, it is the ability to comment upon, produce, and comprehend language. Meta-linguistic awareness encompasses two distinct and yet related stages, the intuitive and the conscious awareness stage. *Intuitive stage:* It does not imply any understanding of the processes being used, just the ability to use those processes. For example, a person could be speaking a language and not understanding the underlying conceptual foundations. *Conscious Awareness Stage:* It implies the awareness of the formal nature of the processes one is employing as well as implying accompanying mastery. It is the ability to comment, use and reflect upon the language at a formal level.

Sentence Ambiguities

This task encompasses five types of ambiguities namely, Phonological Ambiguities, Lexical Ambiguities, Surface Structure Ambiguities, Underlying Structure Ambiguities and Phoneme Segmentation with no phonemic distortion ambiguities.

Phonological Ambiguity: An ambiguity that results when two similar phonetic sequences (which differ only in a single phonological segment) identify two separate words, which have different meanings, e.g., craker/quaker (Hirsh-Pasek et al., 1978, p.118).

Lexical Ambiguity: An ambiguity that results when a single phonological sequence identifies two separate words which have different meanings, e.g., bark/bark (Hirsh-Pasek et al.,1978, p.118).

Surface Structure Ambiguity: An ambiguity that results when a single sequence of words can be bracketed in two different ways, identifying different sentence meanings, e.g., (man) (eating fish) / (man eating) (fish) (Hirsh-Pasek et al.,1978, p.118).

Underlying Structure Ambiguity: An ambiguity that results when a single sequence of words has two transformational sources, or two labelings identifying different sequential meanings, e.g., make me a milkshake as make a milk shake for me / out of me (Hirsh-Pasek et al., 1978, p.118).

Phoneme Segmentation Problems with no phonemic distortion ambiguity: Those ambiguities which are caused by a separation of a compound syllabic structure into its components or by the fusion of two or more morphemes into a compound syllabic structure. Separation and combination yield the phonetic effects of different stress patterns, intonation and time intervals. For example: What did the Indian boy say when his dog fell off the cliff? Why, doggone of course. (Hirsh-Pasek et al., 1978, p.118).

Major Hypotheses

Hypothesis 1.

The meta-linguistic tasks encompassing Sentence Ambiguity (jokes), Definition of a Word including Short, Long, and Difficult Word, and Interchangeability of Labels will emerge as a single factor.

Hypothesis 2.

The two specific tasks related to reading comprising Auditory Analysis Test (Auditory Segmentation and Synthesis) and Morphophonological Knowledge will emerge as a second and distinct factor.

Hypothesis 2B.

Auditory Phonological Segmentation and Synthesis will be highly related to the specific tasks related to reading and as such will load on a seperate factor from the meta-linguistic tasks.

Hypothesis 3.

There will be a main effect for reading ability. The four reading groups will be significantly different from each other on both factors. Superior Readers will have the highest score on each factor, followed by Average, Below Average and Significantly Below Average Readers, in turn (at both ability levels of 9 and 11 years of age respectively).

Hypothesis 4.

There will be a significant interaction between factor type and reading level. This analysis is somewhat exploratory and therefore the direction of the interaction is not specified.

Sample

Three hundred and ninety children, consisting of an equal number of males and females, served as subjects. They were selected on the basis of their scores on the Edmonton Public School Board Reading Test (1980), and on the Canadian Cognitive Ability Test (1974). To eliminate possible differences due to the amount and quality of school experience as well as facility with the English language, only Canadian, English speaking children were chosen.

The subjects were obtained from 15 elementary schools in the Edmonton Public School Board. The data was gathered between the dates of January 17, to February 28, 1983 inclusively.

The 7 year old group consisted of Superior Readers only and not Average, Below Average and Significantly Below Average Readers. The relatively large sample size (N=390) and the time required to administer the tasks imposed time restraints. Nevertheless, it was felt that including a 7 year old Superior Reading group would provide an additional point across the Superior Reading groups particularly with respect to a qualitative analysis responses to the tasks. This, it was thaught, to further clarify the relationship between meta-linguistic ability and age.

Three criteria were considered with respect to the selection of the sample population. These were: academic achievement (reading level), IQ, and age. The requirements for each will be subsequently discussed. A detailed description of the sample is provided in Table 1.

Academic Achievement and Age Criteria

Twenty five students at each of the age levels of seven, nine and eleven years served as Superior Reading Groups. In addition, twenty 9 and 11 year olds at each of the following reading levels: Average Readers (AR), Below Average Readers (BA) and Significantly Below Average Readers (SBA) were selected from children attending regular classes in the Edmonton Public School System.

Superior and normal readers were selected from those children with no record of academic problems in their respective grade levels. This was determined by an examination of the Cumulative Records of each individual. The superior readers were selected on the basis of having scored greater or equal to the 75th. % ile.on both the decoding and comprehension subtests of the Edmonton Public

TABLE 1
DESCRIPTION OF SEX, CHRONOLOGICAL AGE AND IQ CHARACTERISTICS OF SUBJECTS (N = 390)

			C.A. CHARACTERISTICS		I Q CHARACTERISTICS						READING CHARACTERISTICS			
					VERBAL		QUANTITATIVE		NON VERBAL		DEC. %ILE		COMP. %ILE	
GROUPS	N	SEX	X*	SD	X*	SD	X*	SD	X*	SD	X*	SD	X*	SD
7-YR. OLD SUPERIOR READERS	25	M	87.680	2.641							90.600	5.986	88.120	6.870
	25	F	87.040	3.089							88.230	7.587	87.680	6.033
9-YR. OLD SUPERIOR READERS	25	M	110.720	2.851	119.520	9.310	118.080	9.309	118.080	8.391	86.240	8.932	85.440	6.995
	25	F	11.600	2.598	123.560	8.140	116.720	7.961	120.880	9.576	90.120	7.463	88.880	7.097
11-YR.OLD SUPERIOR READERS	25	M	136.560	2.567	121.640	4.881	118.680	6.190	120.120	6.438	88.640	5.859	90.040	6.432
	25	F	134.960	3.529	123.240	8.843	119.920	6.538	121.040	8.839	90.040	7.144	89.040	7.749
9-YR. OLD AVERAGE READERS	20	M	110.950	3.410	105.700	6.705	102.650	5.788	103.550	6.419	57.250	6.282	59.250	5.857
	20	F	108.100	2.972	107.100	6.078	103.650	4.955	105.100	6.198	57.650	5.122	57.450	5.689
11-YR. OLD AVERAGE READERS	20	M	136.650	2.183	108.300	8.189	107.900	6.797	109.400	6.863	59.250	4.315	61.550	3.886
	20	F	136.300	2.755	106.150	6.037	104.650	6.596	104.900	6.797	61.000	2.902	61.850	2.758
9-YR. OLD BELOW AVERAGE READERS	20	M	112.150	3.249	100.100	3.249	99.500	2.893	99.900	1.971	26.600	2.501	28.350	3.646
	20	F	112.150	2.777	103.050	5.395	102.200	4.584	102.100	6.147	29.250	2.049	32.050	3.649
11-YR. OLD BELOW AVERAGE READERS	20	M	134.000	2.938	106.150	9.577	105.450	9.099	103.650	6.201	30.900	5.553	30.550	4.740
	20	F	135.350	3.117	108.500	7.345	106.350	7.485	106.000	5.601	29.850	3.617	30.750	4.745
9-YR. OLD SIG. BELOW AVERAGE READERS	20	M	112.150	3.731	100.850	2.621	99.450	3.818	100.250	2.881	8.750	4.822	8.300	4.414
	20	F	110.450	3.576	102.450	2.259	101.700	2.320	102.350	2.641	8.000	4.329	8.500	4.286
11-YR. OLD SIG. BELOW AVERAGE READERS	20	M	136.300	2.386	99.600	9.467	102.850	3.717	102.300	2.993	9.050	4.383	12.050	2.819
	20	F	136.100	2.990	101.600	3.267	101.850	3.720	101.500	3.502	9.000	4.542	11.000	4.000

* (months)

School Board Reading Test. The normal readers' performance on this test reflected a score ranging from the 50th. to the 65th. %ile. on both decoding and comprehension subtests. The below average reader was characterized as experiencing difficulty in the areas related to reading. Specifically, this group of children are described as performing between the 25th. and 35th. %ile., inclusive, on both the decoding and comprehension subtests. Finally, the severe reading disabled group was selected on the basis of their experiencing numerous problems with reading tasks and specifically scoring less than or equal to the 15 th. %ile. on both the decoding and comprehension subtests.

IQ Criteria

IQ scores were obtained for children participating in this study with the exception of the seven year olds. These IQ. scores were not available since the Edmonton Public School Board administers intelligence tests beginning at the grade 3 level. Full Scale IQ scores of 85+ were considered an index of normal intellectual ability.

IQ scores for the four groups were obtained from the school records.(Canadian Cognitive Abilities Test, 1974). A brief description of the Canadian Cognitive Ability Test and the Elementary Reading Test utilized in this study, will now follow.

Canadian Cognitive Ability Test

The Canadian Cognitive Ability Test is primarily a revision and an extension of the Lorge Thorndike Intelligence Test. The CCAT encompasses three subtests: A Verbal (V), a Non Verbal (NV) and a Quantitative (Q) subtest for grades 3 to 12.

The Verbal subtest score, measuring verbal ability and/or scholastic aptitude, is achieved through direct measures of vocabulary, sentence completion, verbal classification and verbal analogies questions. The Quantitative subtest is higly school oriented and measures quantitative relations, number series and equation building. The Non Verbal subtest does not employ words or numbers. The total score is achieved via the individual's performance on figure analogies, figure classification and figure synthesis sections of the test.

Reliability: The K-R 20 reliability estimate of raw scores for the V, Q and NV subtests are quite high (.89 to .96) for all levels of the test. When speed was taken into consideration, the reliability remained quite high (.87 to .94).

Validity: Concurrent correlations of the C.A.T. subtests with I.T.B.S. (grades 3 to 8) or the T.A.P. (grades 9 to 12) are quite high. Specifically, the V subtest correlates the highest (approximately .75), the Q subtest correlates at about .70 while the Non Verbal subtest is the lowest at about .60. The Q subtest correlates higher with mathematics than the V subtest (.77 vs. .73 respectively) for grades 3 to 8. The correlations of the V, Q and NV subtests with the Stanford Binet are about .65 to .75.

Elementary Reading Test

The Elementary Reading Test (Edmonton Public School Board Reading Test)-Grades 3 through 6 was designed to assess Decoding Skills and Comprehension Skills. The Validity of this test was not determined statistically but was determined to be valid by a committee of elementary teachers, consultants, and Reading Specialists who constructed, reviewed, and revised the test.

The reliability of this test was calculated using the Kuder-Richardson 20 formula. The reliability of the test for different grade levels is as follows:

Grade 3= 0.932
Grade 4= 0.951
Grade 5= 0.949
Grade 6= 0.945

Choice of Tasks

The test battery described in this section is designed to sample meta-linguistic awareness, its development, and its relationship to reading acquisition.

Tests are selected from a variety of different sources, as no appropriate test battery is available. Accordingly, the tasks chosen as measures of meta-linguistic awareness have been previously used, individually, to measure this particular skill. Thus, "Word Awareness Test" "Sentence Ambiguity Test" and "Interchangeability of Labels" were adopted as generic metalinguistic measures.

Furthermore, since the proposed study is also concerned with reading acquisition, a number of tasks which have been directly related to both meta-linguistic skills and o reading itself were adopted. These tasks were: Auditory Analysis Test (Rosner & Simons, 1978); Morphophonemic Knowledge Test (Berko, 1958; Berry 1966; Doehring et al., 1981); Short Term Memory Test (Doehring et al., 1981; McNeill, 1970). The above tasks are subsequently described.

Reading itself was measured by the Edmonton Public School Board Reading Test (1980).

Experimental Tasks

The tasks were presented in a randomized order and included the following: Word Awareness Task; Ambiguity of Sentences (jokes); Interchangeability of Labels; Short Term Verbal Memory; Morphophonemic Knowledge Task; Auditory

Analysis Task (Auditory Phonological Segmentation & Synthesis).

Word Awareness Task

This task, being similar to that used by Berthoud-Papandropoulou (1978), requires each subject to provide a definition of the term 'word' as well as to provide examples of words containing certain properties (a 'long' word, a 'short' word and a 'difficult ' word). Furthermore, subjects were requested to justify the example they provided for each word property. It was anticipated that this task would provide an insight into the subject's awareness of the elements of language and objects in the outside world.

Qualitative analysis was also performed on the children's responses and the changes in pattern were studied. This test was administered individually and required 5 to 10 minutes of administration time. The responses were scored according to the Berthoud-Papandropoulou's (1978) criteria:

A score of 1 was given if the response indicated a failure to differentiate between words,and/or things and/or action.

A score of 2 was given if the response indicated a greater differentiation from the reality they represent. For example: "Words are seen as labels that correspond to things, and as such, have an independent existence"(Berthoud-Papandropoulou, 1978, p.59).

A score of 3 was given if the response indicated that words are considered to be larger meaningful units. For example: Words are part of a sentence.

A score of 4 was given if the response included grammatical terms. However, the individual was not aware that these grammatical terms refer to subsets.

A score of 5 was given when the response indicated meaning. For example: a word is made up of letters and it tells you something.

A score of 6 was given when the response indicated that words which do not have meaning outside a sentence are still words. For example: prepositions, articles.

A score of 7 was given when the response included grammatical nomenclature and the individual realized that the terms referred to subsets.

A score of 8 was given when the response included reference to the sentence, formal categories and the grammatical rules that link them.

Ambiguity of Sentences Task

This task measures the subject's ability to appreciate and explain jokes that 'turn' on a variety of language ambiguities. The stimuli, scoring procedure and instructions were derived from Hirsh-Pasek, Gleitman and Gleitman's (1978) study. These investigators abstracted the jokes from children's joke books as well as magazines and pretested the jokes for vocabulary difficulty. All jokes were at a grade 2 level of difficulty.

Sixty orally presented jokes encompassing 10, 12, 6, 11, and 11 jokes respectively are found in each of the following categories: Phonological, Lexical, Surface Structure, Deep Structure, Underlying Structure, Morpheme Boundary and Morpheme Boundary with no Phonetic Distortion. The jokes, classified according to type of ambiguity, were presented in a randomized order.

The scoring procedure is based on a 1 to 6 point system with the range of possible scores extending from 0 to 300. The subject's explanation of jokes were categorized as follows:

1. 1- Did not understand the joke, and did not know both meanings of all words in the joke.
2. 2- Did not understand the joke but knew the meaning of all the words in the joke.
3. 3- Understood the joke only after encouragment of the sort: "He said, 'so and so' right? Are there two meanings for 'so and so'"?
4. 4- Understood the joke but needed some encouragement to try harder.
5. 5- Understood the joke with little encouragement.
6. 6- Understood the joke immediately and explained it.

   Testing time for this task was approximately one-half hour per subject. See Appendix A for complete task.

Interchangeability of Labels Task

This task consisted of 4 items, orally presented to each child by the experimenter. For example: *Can I call the sun the moon and the moon the sun? What would night look like?* Children were required to justify their responses as well as to provide examples based on their decision. The scoring method adopted was as follows: One point was given to the child based on a correct "yes/no" response and the child's correct justification. A score of 0 was recorded if the individual provided either an incorrect response or justification. Testing time for this task was approximately 5 minutes. See Appendix A for complete task.

Short Term Memory Task

This task involves a word repetition test of the type used by Doehring et al., (1981).

The subjects was required to repeat a series of 16 orally presented sequences of five words exactly as they had been presented (spoken). This test encompasses four sequences containing unrelated words (U.W.) four containing randomly related words (R.W.), four grammatically correct and meaningless words (G.C.M.), and four meaningfull sentences (M.S.).

Following the Doehring et al.(1981), procedure, the number of correct responses in each subtest were used as total scores. Testing time for this task was approximately 5 minutes. See Appendix A for complete task.

Auditory Analysis Task

Rosner and Simon's (1978) Auditory Analysis Task (A.A.T.) consists of 40 English words varying in length from one to four syllables. The test was administered individually to each student. Subjects were requested to pronounce each word, then to repeat it again omitting a specified sound. With the exception of three words, the omission of a phoneme, phoneme cluster or syllable would result in a pronounceable and meaningful English word. The sounds to be eliminated consists of 13 consonants, one consonant diagraph, two consonant blends and 12 syllables.

The task is ordered in hierarchical difficulty encompassing seven categories:(1) omission of the final syllable of a two syllable word,(2) omission of the initial syllable of a two syllable word,(3) omission of the final consonant of a one syllable word,(4) omission of the initial consonant of a one syllable word,(5) omission of the first consonant of a consonant blend,(6) omission of a medial blend and (7) omission of a medial syllable.

Unlike Rosner and Simon's (1978) procedure, which stopped after 4 consecutive errors or when the individual was unable to understand the training examples, the complete test was administered to all children regardless of their performance. Error scores for each subtest as well as total errors in each subtest were calculated. The test score comprised of the total number of correct responses. The range of the possible scores was from 0 to 40. Testing time for this task was approximately 10 minutes per subject. See Appendix A for complete task.

Morphophonemic Knowledge Task

This task encompasses 3 subtests:(1) knowledge of how to form plurals (PL.) was tested on six trials, (2) past tense (P.T.) was tested on four trials and,(3) third person singular (T.P.S.) was tested on two trials.

Following Berko (1958); Berry(1966); and Doehring et al.,(1981) the following procedure was adopted: each subject was told that they would be presented with some funny pictures, the experimenter would then comment on each of the presented pictures and, finally, each subject was requested to provide some information about the pictures. On each trial the subject was shown a picture(s) and asked to supply the missing word in the statement. Two practice items were provided, for example: *This is a wug; now there is onother one; there are two of them; there are two?*(wugs)(PL.), and *This is a nit who knows how to gutch; he did the same yesterday; what did he do yesterday?* (gutched).

Responses were scored in terms of corrct responses for each subtest as well as the total number of correct responses for all subtests. Testing time for this test was approximately 5 minutes per Subject. See Appendix A for complete task.

The test battery was scored by this investigator and by an independent scorer. The inter-rater reliability was 96%. Any differences in scores given by the two primary raters was discussed with a third rater who made the final decision.

Procedure

The tasks were administered by the author with the help of four research assistants. Three of these assistants were retired teachers and one was a housewife. The research assistants were trained by the author.

The research was carried out in 15 elementary schools in Edmonton. Subjects were tested individually in a private room in their respective schools. The subjects were administered all the tests in either two or three sessions.

Pilot testing of the material, on individual subjects at each grade level, indicated that a short example sequence rather than a formal prescriptive announcement ensured the speediest and most secure understanding of the task requirements. Accordingly, an informal and interactive approach was adopted. In administering the tasks, the following procedural points were considered: (1) individual administration of tests,(2) establishing rapport with the child prior to the administration of the test battery, (3) clarity of instruction, (4) inclusion of sample trial(s) prior to the administration of each test and (5) observation of the child during the testing situation.

IV. RESULTS AND DISCUSSION

This chapter will deal with the findings directly relevant to the predictions presented previously. To facilitate reading, the relevant hypotheses will precede each section. Since the main concern of the study is to determine the relationship between meta-linguistic tasks and the relationship of these tasks to reading skills, the discussion of the results will emphasize this aspect. In pursuit of this goal, attention will first be directed to the relationship between the meta-linguistic tasks and specific tasks related to reading which have previously been used as measures of meta-linguistic awareness.

In order to achieve this goal, first a correlational analysis was conducted followed by a principal factor analysis using subtests of the test battery. The promax-rotated matrices were interpreted. In addition, principal factor and principal component analysis were conducted with total scores. Secondly, the more specific features of meta-linguistic abilities and proficiency with specific skills related to reading were examined within the various ages and across reading levels. A two way analysis of variance with repeated measure (ANOVA), using factor scores as dependent variables, was utilized to detect differences and distinguish reading level groups. Finally, qualitative observations of children's responses to Long, Short and Difficult Word will be presented. In addition children's responses to Interchangeability of Labels and

Word Awareness tasks will be presented and examples provided in order to aid the interpretation of the findings.

Results of Intercorrelation and Factor Analysis

The relevant hypotheses for this section are enumerated as follows: *Hypotheses*

1.) The meta-linguistic tasks: Sentence Ambiguity (jokes), Definition of Word ecompassing Short, Long, and Difficult Word and Interchangeability of Labels will load on a single factor.

2.) The two specific tasks related to reading: Auditory Analysis Test (Auditory Phonological Segmentation and Synthesis), and Morphophonological Knowledge will load on a second factor distinct from the meta-linguistic tasks with Short Term Memory.

In analyzing the data, the correlations and factor analysis were carried out combining all the ability levels of 9 and 11 year old subjects separately. This statistical procedure is adopted since the focus of the study is to investigate the scores across the total range of ability levels. Furthermore analyzing each ability level individually would produce low correlation scores due to the restriction of range. The means and the standard deviations of the variables are presented in Table 2 for 7 year olds, Table 3 for 9 year olds, and Table 4 for 11 year olds.

TABLE 2
MEANS AND STANDARD DEVIATIONS FOR ALL VARIABLES (7 - YEAR OLDS)

VARIABLES	N	MEAN	SD
Phonological Ambiguities	50	31.74	8.58
Lexical Ambiguities	50	33.66	12.02
Surface Structure Ambiguities	50	17.80	7.16
Deep Structure Ambiguities	50	35.36	10.06
Morpheme Boundary With No Phonological Distortions	50	37.36	11.46
TOTAL AMBIGUITIES	50	155.34	41.96
Definition of Word	50	1.34	0.48
Long Word	50	1.04	0.28
Short Word	50	0.86	0.35
Difficult Word	50	0.80	0.40
TOTAL WORD	50	4.04	1.03
Interchangeability Of Labels	50	0.40	0.49

CONTINUED...

TABLE 2 (Continued)
MEANS AND STANDARD DEVIATIONS
FOR ALL VARIABLES (7 - YEAR OLDS)

VARIABLES	N	MEAN	SD
Omission of One Consonant Of One Syllable Word	50	5.44	0.99
Omission Of Initial Consonant Of One Syllable Word	50	5.88	0.39
Omission of First Consonant Of Consonant Blend	50	5.82	1.98
Omission of Medial Consonant	50	6.88	1.69
Omission of Medial Syllable	50	4.92	2.65
TOTAL	50	30.94	5.65
Meaningful Sentences	50	3.28	0.57
Random Words	50	1.10	1.04
Unrelated Words	50	2.02	0.94
Grammatically Correct But Meaningless Words	50	2.14	0.95
TOTAL	50	8.58	2.56
Knowledge of Plurals	50	9.54	0.71
Knowledge of Past Tense	50	7.02	1.12
Knowledge of Possessives	50	5.78	0.46
Knowledge of Third Person Singular	50	2.02	0.62
TOTAL	50	27.92	2.78

TABLE 3
MEANS AND STANDARD DEVIATIONS
FOR ALL VARIABLES (9 - YEAR OLDS)

VARIABLES	N	MEAN	SD
Phonological Ambiguities	170	35.88	9.30
Lexical Ambiguities	170	38.75	10.71
Surface Structure Ambiguities	170	25.57	6.87
Deep Structure Ambiguities	170	37.40	10.97
Morpheme Boundary With No Phonological Distortions	170	37.79	10.67
TOTAL AMBIGUITIES	170	171.28	42.66
Definition of Word	170	1.16	0.52
Long Word	170	0.88	0.41
Short Word	170	0.92	0.29
Difficult Word	170	0.89	0.32
TOTAL WORD	170	3.85	0.97
Interchangeability Of Labels	170	0.58	0.77

CONTINUED...

TABLE 3 (Continued)
MEANS AND STANDARD DEVIATIONS
FOR ALL VARIABLES (9 - YEAR OLDS)

VARIABLES	N	MEAN	SD
Omission of One Consonant Of One Syllable Word	170	5.06	1.11
Omission Of Initial Consonant Of One Syllable Word	170	5.39	0.99
Omission of First Consonant Of Consonant Blend	170	5.99	1.77
Omission of Medial Consonant	170	6.66	1.71
Omission of Medial Syllable	170	5.29	2.67
TOTAL	170	30.24	6.80
Meaningful Sentences	170	3.22	0.90
Random Words	170	1.32	1.14
Unrelated Words	170	2.20	1.18
Grammatically Correct But Meaningless Words	170	2.27	1.15
TOTAL	170	9.04	3.54
Knowledge of Plurals	170	8.93	1.58
Knowledge of Past Tense	170	6.37	1.80
Knowledge of Possessives	170	5.55	0.92
Knowledge of Third Person Singular	170	1.59	0.80
TOTAL	170	26.93	4.90

TABLE 4
MEANS AND STANDARD DEVIATIONS FOR ALL VARIABLES (11 - YEAR OLDS)

VARIABLES	N	MEAN	SD
Phonological Ambiguities	170	42.25	9.73
Lexical Ambiguities	170	48.36	12.13
Surface Structure Ambiguities	170	46.98	10.53
Deep Structure Ambiguities	170	46.98	10.53
Morpheme Boundary With No Phonological Distortions	170	46.85	9.67
TOTAL AMBIGUITIES	170	208.75	42.13
Definition of Word	170	1.44	0.65
Long Word	170	10.04	0.19
Short Word	170	10.04	0.23
Difficult Word	170	1.01	0.17
TOTAL WORD	170	4.52	0.87
Interchangeability Of Labels	170	1.11	1.13

CONTINUED...

TABLE 4 (Continued)
MEANS AND STANDARD DEVIATIONS FOR ALL VARIABLES (11 - YEAR OLDS)

VARIABLES	N	MEAN	SD
Omission of One Consonant Of One Syllable Word	170	5.62	0.70
Omission Of Initial Consonant Of One Syllable Word	170	5.72	0.55
Omission of First Consonant Of Consonant Blend	170	6.99	1.26
Omission of Medial Consonant	170	7.16	1.49
Omission of Medial Syllable	170	6.64	1.49
TOTAL	170	30.05	4.92
Meaningful Sentences	170	3.60	0.65
Random Words	170	1.84	1.07
Unrelated Words	170	2.81	0.97
Grammatically Correct But Meaningless Words	170	2.97	0.83
TOTAL	170	11.28	2.88
Knowledge of Plurals	170	8.92	1.21
Knowledge of Past Tense	170	7.05	1.23
Knowledge of Possessives	170	5.71	0.59
Knowledge of Third Person Singular	170	1.81	0.53
TOTAL	170	29.94	3.19

The intercorrelation matrices are presented in Tables 5 and Table 6 for 9 and 11 year olds, respectively. The correlation matrices for each age group were derived from the raw scores of all 170 subjects for the two groups (9 and 11 years of age).

As may be seen from Tables 5 and 6, the intercorrelations for both 9 and 11 year olds among the meta-linguistic tasks were significant. The overall patterns of these results suggest that the meta-linguistic tasks as a whole, correlate highly with each other. More specifically, the intercorrelation amongst the different subtests of the Sentence Ambiguity task were very high (ranging from .550 to .822). In addition, the intercorrelations between the Sentence Ambiguity subtests, Definition of a Word and Interchangeability of Labels tasks were also high. It is interesting to note that intercorrelations of Long, Short, and Difficult Word tasks were low. Their correlations with the meta-linguistic tasks, and with other tasks in the battery were also low.

The three tasks, Long, Short, and Difficult Word, which require an example and justification for the response do not therefore appear to be good measures of generic meta-linguistic abilities. This finding may have been directly related to the nature of the task itself as a relatively high performance can be achieved on this task without understanding the special properties that make natural language unique as a means of communication and

TABLE 5

INTERCORRELATIONS (POOLED) AMONG ALL VARIABLES FOR 9 - YEAR OLDS

VARIABLES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1 Decoding Skills																														
2 Comprehension Skills	.89**																													
3 Phonological Ambiguities	.67**	.68**																												
4 Lexical Ambiguities	.70**	.70**	.74**																											
5 Surf. Struct. Ambiguities	.56**	.57**	.65**	.61**																										
6 Deep Struct. Ambiguities	.76**	.77**	.73**	.60**	.68**																									
7 Morpheme Boundary (No phonol. distortions)	.68**	.71**	.68**	.71**	.55**	.82**																								
8 TOTAL	.77**	.78**	.86**	.89**	.78**	.93**	.87**																							
9 Definition of a Word	.47**	.45**	.43**	.46**	.27**	.38**	.39**	.46**																						
10 Long Word	.30**	.33**	.35**	.26**	.30**	.33**	.38**	.34**	.13																					
11 Short Word	.16*	.17*	.16*	.17*	.18**	.17*	.20**	.20**	.13	.37**																				
12 Difficult Word	.33**	.35**	.23**	.24**	.17*	.24**	.28**	.29**	.26**	.12	.17*																			
13 TOTAL	.93**	.54**	.48**	.53**	.43**	.48**	.47**	.54**	.71**	.64**	.57**	.56**																		
14 Interchangeability Of Labels	.50**	.50**	.46**	.41**	.36**	.48**	.44**	.50**	.22**	.17*	.09	.24**	.30**																	
15 Omissn. Final Consonant (One-Syllable Word)	.51**	.53**	.34**	.42**	.32**	.43**	.46**	.45**	.15*	.33**	.18*	.36**	.38**	.29**																
16 Omissn. Initial Consonant (One Syllable Word)	.44**	.45**	.45**	.40**	.39**	.40	.45**	.46**	.18**	.32**	.17*	.18**	.34**	.34**	.57**															
17 Omissn. Initial Consonant (One Syllable Word)	.53**	.56**	.43**	.34**	.29**	.39**	.33**	.43**	.25**	.10	.05	.24**	.27**	.32**	.44**	.28**														
18 Omission of a Medial Consonant	.56**	.58**	.45**	.54**	.36**	.51**	.54**	.57**	.26**	.38**	.16*	.26**	.46**	.31**	.56**	.58**	.40**													
19 Omission of a Medial Syllable	.65**	.67**	.50**	.53**	.46**	.53**	.54**	.58**	.27**	.26**	.22**	.23**	.45**	.35**	.51**	.43**	.57**	.60**												
20 TOTAL	.71**	.73**	.57**	.60**	.45**	.59**	.59**	.65**	.34**	.35**	.19**	.34**	.50**	.39**	.73**	.68**	.72**	.80**	.86**											
21 Meaningful Sentences	.54**	.55**	.46**	.47**	.53**	.55**	.51**	.56**	.38**	.42**	.16**	.36**	.55**	.26**	.44**	.29**	.34**	.47**	.47**	.53**										
22 Random Words	.36**	.28**	.42**	.38**	.46**	.42**	.43**	.46**	.25**	.17*	.13*	.23**	.22**	.35**	.28**	.23**	.25**	.34**	.44**	.42**	.46**									
23 Unrelated Words	.42**	.43**	.49**	.36**	.43**	.49**	.49**	.53**	.21**	.17*	.10	.15*	.26**	.36**	.27**	.25**	.35**	.34**	.50**	.48**	.49**	.45**								
24 Grammatically Correct But Meaningless Words	.60**	.61**	.54**	.48**	.55**	.54**	.50**	.68**	.38**	.33**	.10	.26**	.46**	.35**	.45**	.38**	.48**	.44**	.58**	.62**	.61**	.51**	.67**							
25 TOTAL	.59**	.60**	.58**	.52**	.61**	.61**	.58**	.66**	.36**	.33**	.15*	.30**	.48**	.43**	.47**	.35**	.44**	.48**	.61**	.63**	.76**	.75*	.82**	.87**						
26 Knowledge of How To Make Plurals	.37**	.38**	.32**	.37**	.34**	.37**	.34**	.40**	.18**	.21**	.20**	.10	.27**	.18**	.31**	.39**	.23**	.42**	.31**	.40**	.32**	.08	.21**	.27**	.27**					
27 Knowledge of How To Make Past Tense	.44**	.45**	.40**	.48**	.39**	.49**	.46**	.53**	.20**	.24**	.07	.16*	.36**	.27**	.36**	.27**	.33**	.56**	.42**	.51**	.41**	.34**	.39**	.37**	.47**	.54**				
28 Knowledge of How To Make Possessives	.36**	.38**	.27**	.32**	.29**	.30**	.30**	.34**	.18**	.21**	.16*	.27**	.32**	.23**	.27**	.25**	.24**	.28**	.23**	.32**	.35**	.13*	.22**	.26**	.28**	.47**	.32**			
29 Knowledge of How To Make Third Person Singular	.28**	.38**	.17*	.29**	.17*	.27**	.37**	.27**	.21**	.08	.10	.30**	.34**	.22**	.25**	.11*	.33**	.25**	.31**	.32**	.26**	.18**	.17*	.23**	.26**	.36**	.32**	.52**		
30 TOTAL	.60**	.60**	.49**	.56**	.53**	.57**	.51**	.61**	.35**	.25**	.19**	.27**	.43**	.36**	.42**	.40**	.43**	.58**	.45**	.58**	.50**	.30**	.37**	.44**	.49**	.77**	.77**	.58**	.55**	

* p < .05
** p < .01

TABLE 6

INTERCORRELATIONS (POOLED) AMONG ALL VARIABLES FOR 11 - YEAR OLDS

VARIABLES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1 Decoding Skills																														
2 Comprehension Skills	.35**																													
3 Phonological Ambiguities	.67**	.69**																												
4 Lexical Ambiguities	.71**	.73**	.60**																											
5 Surf. Struct. Ambiguities	.56**	.56**	.49**	.58**																										
6 Deep Struct. Ambiguities	.55**	.68**	.65**	.73**	.62**																									
7 Morpheme Boundary (No phonol. distortions)	.74**	.74**	.67**	.72**	.55**	.77**																								
8 TOTAL	.76**	.80**	.87**	.93**	.71**	.86**	.88**																							
9 Definition of a Word	.62**	.62**	.52**	.50**	.41**	.59**	.60**	.61**																						
10 Long Word	.29**	.22**	.21**	.20**	.13*	.16*	.15**	.21**	.26**																					
11 Short Word	.26**	.28**	.29**	.38**	.20**	.29**	.26**	.39**	.24**	.29**																				
12 Difficult Word	.13*	.14*	.19**	.21**	.11	.15*	.20**	.20**	.06	.37**	.30**																			
13 TOTAL	.61**	.61**	.53**	.52**	.40**	.57**	.59**	.61**	.88**	.85**	.95**	.41**																		
14 Interchangeability Of Labels	.46**	.47**	.36**	.43**	.38**	.41**	.39**	.48**	.48**	.12	.07	.00	.37**																	
15 Omission, Final Consonant (One-Syllable Word)	.29**	.37**	.28**	.28**	.34**	.34**	.29**	.35**	.37**	.06	.13*	.01	.39**	.23**																
16 Omission, Initial Consonant (One Syllable Word)	.31**	.30**	.22**	.28**	.31**	.35**	.24**	.21**	.20**	.04	.09	.08	.18**	.22**	.28**															
17 Omission, Initial Consonant (One Syllable Word)	.45**	.43**	.24**	.33**	.35**	.36**	.30**	.39**	.34**	.10	.13*	.11	.33**	.30**	.36**	.27**														
18 Omission of a Medial Consonant	.42**	.41**	.31**	.43**	.28**	.33**	.30**	.43**	.21**	.04	.12	.11	.33**	.23**	.32**	.26**	.46**													
19 Omission of a Medial Syllable	.66**	.65**	.44**	.50**	.45**	.49**	.50**	.57**	.45**	.13*	.14*	.15*	.43**	.30**	.40**	.32**	.59**	.52**												
20 TOTAL	.69**	.63**	.43**	.53**	.47**	.61**	.46**	.57**	.44**	.11	.17*	.17*	.43**	.36**	.60**	.47**	.73**	.75**	.85**											
21 Meaningful Sentences	.25**	.25**	.27**	.23**	.31**	.16*	.21**	.27**	.21**	.06	.07	.07	.20**	.14*	.16*	.16**	.28**	.32**	.35**	.37**										
22 Random Words	.46**	.44**	.29**	.45**	.49**	.46**	.43**	.50**	.30**	.12	.19*	.17*	.30**	.29**	.30**	.11	.33**	.33**	.40**	.45**	.40**									
23 Unrelated Words	.31**	.31**	.23**	.32**	.28**	.29**	.21**	.29**	.23**	.04	.17*	.08	.23**	.26**	.28**	.13*	.26**	.28**	.33**	.40**	.45**	.50**								
24 Grammatically Correct But Meaningless Words	.42**	.41**	.36**	.42**	.47**	.40**	.29**	.45**	.26**	.11	.12	.15*	.27**	.22**	.26**	.20**	.35**	.38**	.38**	.48**	.37**	.47**	.65**							
25 TOTAL	.47**	.46**	.44**	.48**	.54**	.45**	.40**	.52**	.33**	.10	.24**	.15*	.35**	.36**	.34**	.19**	.37**	.38**	.45**	.52**	.64**	.77**	.81**	.80**						
26 Knowledge of How To Make Plurals	.25**	.24**	.16*	.18**	.15*	.15*	.09	.17*	.12	.01	.01	-.25	.04	.24**	.12	.06	.33**	.25**	.21**	.23**	.18**	.13*	.35**	.26**	.30**					
27 Knowledge of How-To Make Past Tense	.33**	.34**	.25**	.29**	.26**	.29**	.29**	.35**	.29**	.12	.10	.03	.24**	.18**	.29**	.03	.37**	.24**	.37**	.30**	.17*	.37**	.38**	.26**	.33**	.33**				
28 Knowledge of How To Make Possessives	.19*	.14*	.19*	.21**	.16**	.12	.10	.16**	.06	.10	.05	.02	.09	.08	.24**	.16*	.23**	.26**	.20**	.39**	.09	.09	.22**	.20**	.21**	.39**	.35**			
29 Knowledge of How To Make Third Person Singular	.14*	.15*	.09	.11	.16**	.14*	.19*	.14*	.09	.01	.06	.01	.09	.00	.38**	.03	.29**	.22**	.25**	.33**	.09	.07	.17*	.20**	.17*	.19**	.32**	.42**		
30 TOTAL	.40**	.38**	.33**	.34**	.41**	.43**	.35**	.42**	.39**	.06	.12	-.11	.31**	.27**	.37**	.18**	.40**	.37**	.45**	.48**	.23**	.30**	.30**	.31**	.38**	.64**	.69**	.57**	.40**	

* p < .05

** p < .01

representation. Thus, the child's *use* of language to express his general structure of knowledge *about* language - the representational system which the individual has reconstructed and has learned to apply - is not fully 'tapped' by these tasks.

The overall pattern of these results suggest that the meta-linguistic tasks as a whole, with the exception of Long, Short and Difficult Words, correlate highly with each other.

The intercorrelations were also high among the Specific Tasks Related to Reading. This was evident for both the 9 and 11 year olds.

Total scores on Short Term Memory is related to Auditory Phonological Segmentation and Synthesis (r=.63, df=168, p<.01), Morphophonological Knowledge (r=.44, df=168, p<.01), Sentence Ambiguity (r=.66, df=168, p<..01), Word Definition including Long, Short and Difficult Word (r=.48, df=168, p<.01), and Interchangeability of Labels (r=.43, df=168, p<.01). The same pattern is evident for the 11 year old sample. The corresponding correlations with Short Term Memory total were: Auditory Phonological Segmentation and Synthesis (r=.52, df=168, p<.01), Morphophonological Knowledge (r=.65, df=168, p<.01), Sentence Ambiguity (r=.33, df=168, p<.01), Definition of a Word including Short, Long and Difficult Word (r=.35, df=168, p<.01) and Interchangeability of Labels (r=.36, df=168, p<.01). All of these tasks require the the individual to retain the information into some store, process the information and retrieve that information. Therefore, short term memory is a pervasive variable across a variety of tasks.

Factor Analysis

Factor Analysis was carried out in order to further determine the relationship between specific tasks related to reading and the meta-linguistic tasks. Loadings of .4 and above are considered significant. This is an arbitrary decision however, a .4 loading is considered to be a rather conservative cut-off point. The need to be conservative, in terms of the cut-off point, was based on the fact that previous research has reported a high variability in subjects' responses; lack of objectivity of the tasks; and the nature of the data itself.

Principle component analysis for the 11 year olds resulted in 5 eigenvalues greater than 1. However, only 2 principal factors were extracted and rotated, for the following reasons. Examination of the varimax-rotated first 5 components indicated that these components were comprised of: Sentence Ambiguity subtests, Definition of a Word and Interchangeability of Labels; Short Term Memory subtests, Morphophonological Knowledge subtests, and Long, Short and Difficult Word. The eigenvalues for the first five components were 7.3, 2.1, 1.5, 1.4, and 1.3 respectively. Since the eigenvalues leveled off after the second component is extracted and since the five components comprise subtests grouping similar to the test battery, it was felt that more information would be obtained by interpreting a two factor solution. Principle component analysis, for the 9 year olds, resulted in 6 eigenvalues greater than one. The eiganvalues for the first six components were 9.1, 1.6, 1.3, 1.3, 1.2, 1.2, and 1.1, respectively. Examination of the varimax-rotated first five and six components indicated patterns similar to the corresponding matrices for the 11 year olds. Therefore, only two principal factors were extracted and interpreted for the 9 year olds. Factor matrices were rotated to both the varimax (orthogonal) and promax (oblique) criteria. Since the correlations among factors were high for both the 9 year olds (r=.702) and 11 year olds (r=.609), the promax-rotated matrices were interpreted. The pattern matrices for each age groups is displayed in Table 7.

The implications of the correlational data was further supported by the principal component analysis of the 23 variables. As may be seen from Table 7 two factors emerged. The first factor was defined by Sentence Ambiguity, Definition of a Word and Interchangeability of Labels, while the second factor was defined by Auditory Segmentation and Synthesis and Morphophonological Knowledge.

The loadings for Short Term Memory subtests were discrepant across age groups. Short Term Memory loaded on the first factor (META) for 9 year olds and on the second

TABLE 7
PRINCIPAL FACTOR ANALYSIS WITH PROMAX ROTATION OF 23 VARIABLES

TESTS	9 - YEAR OLDS (N = 170)			11 - YEAR OLDS (N = 170)		
	META	SPECIFIC	h2	META	SPECIFIC	h2
Phonological Ambiguities	.881	-.089	.673	.810	-.033	.625
Lexical Ambiguities	.721	.118	.654	.866	.012	.763
Deep Structure Ambiguities	.865	-.002	.746	.850	.008	.731
Surface Structure	.818	-.104	.563	.513	.264	.498
Morpheme Boundary	.731	.100	.648	.892	-.095	.701
Definition of a Word	.497	-.016	.236	.662	.001	.439
Long Word	.112	.361	.199	.369	-.130	.095
Short Word	.028	.256	.076	.393	-.087	.121
Difficult Word	.137	.284	.162	.473	-.266	.141
Interchangeability of Labels	.510	.204	.278	.328	.172	.256
Omission of Final Consonant Of One Syllable Word	.108	.596	.458	.082	.473	.278
Omission of Initial Consonant Of a Consonant Blend	.064	.594	.411	.225	.170	.126
Omission of First Consonant Of a Consonant Blend	.267	.347	.322	.107	.543	.377
Omission of Medial Consonant	.161	.642	.583	.113	.509	.343
Omission of Medial Syllable	.483	.300	.528	.344	.446	.504
Meaningful Sentences	.515	.232	.486	.078	.400	.204
Random Words	.647	-.116	.358	.370	.319	.382
Unrelated Words	.697	-.063	.428	-.019	.670	.433
Grammatically Correct But Meaningless Words	.739	.030	.579	.129	.578	.441
Knowledge of Plurals	.150	.740	.414	-.280	.673	.302
Knowledge of Past Tense	.168	.522	.424	.046	.490	.264
Knowledge of Possessives	-.134	.666	.337	-.258	.653	.288
Third Person Singular	-.141	.618	.280	-.244	.604	.245
% of Total Variance	49.26	32.48		42.19	32.48	
% of Common Variance	63.22	36.78		56.50	43.50	

factor (Specific) for 11 year olds. Loadings on the varimax-rotated factors are displayed in Table 8. The defination of the orthogonal factors (varimax-rotation) is almost identical to that of the oblique factors (promax-rotation), particularly for the 9 year olds. Differences which ocurred usually reflect a slight change in test loadings which alter their salience status without altering the ranking of that test's loading on the two factors. For example, Interchangeability of Labels for 11 year olds. The test has a higher loading on meta-linguistic abilities whether varimax or promax rotation is used. However, the test's loading on that factor exceeds the salience's criteria of .4 only after promax-rotation.

Some researchers have argued that, although oblique rotation enhances simple structure, high correlations among factors are problematic for factor definition. The arguement could be raised that, since a high correlation between factors is evident at both age levels, the two factors cannot be distinguished if obliquely rotated. To determine the stability of the factors' definitions under oblique rotation the salient variables for each factor were compared across rotation methods (promax and varimax). The salient variable similarity index s (Cattell, 1978), was calculated for comparison of orthogonal and oblique loadings for each of the Meta and Specific Factor at each age level. The pattern of salient variables for both factors was basically identical across rotation methods at both age levels. The

TABLE 8
PRINCIPAL FACTOR ANALYSIS WITH VARIMAX ROTATION OF 23 VARIABLES

TESTS	8 - YEAR OLDS (N = 170)			11 - YEAR OLDS (N = 170)		
	META	SPECIFIC	h2	META	SPECIFIC	h2
Phonological Ambiguities	.781	.253	.673	.754	.239	.625
Lexical Ambiguities	.712	.384	.654	.820	.300	.763
Deep Structure Ambiguities	.799	.326	.746	.804	.291	.701
Surface Structure	.718	.216	.563	.565	.422	.498
Morpheme Boundary	.714	.372	.648	.811	.207	.731
Definition of a Word	.453	.174	.236	.625	.222	.493
Long Word	.239	.377	.199	.307	-.000	.095
Short Word	.121	.247	.076	.344	.049	.121
Difficult Word	.236	.324	.162	.363	-.095	.141
Interchangeability of Labels	.481	.217	.278	.414	.291	.256
Omission of Final Consonant Of One Syllable Word	.325	.593	.458	.224	.477	.278
Omission of Initial Consonant Of a Consonant Blend	.284	.575	.411	.265	.237	.126
Omission of First Consonant Of a Consonant Blend	.378	.423	.322	.269	.552	.377
Omission of Medial Consonant	.391	.656	.583	.264	.522	.343
Omission of Medial Syllable	.560	.462	.528	.462	.539	.504
Meaningful Sentences	.563	.411	.486	.197	.406	.204
Random Words	.580	.149	.358	.447	.427	.382
Unrelated Words	.620	.207	.428	.189	.631	.433
Grammatically Correct But Meaningless Words	.695	.310	.597	.300	.593	.441
Knowledge of Plurals	.141	.628	.414	-.056	.547	.302
Knowledge of Past Tense	.352	.547	.424	.191	.481	.269
Knowledge of Possessives	.128	.566	.337	-.041	.535	.288
Third Person Singular	.103	.519	.280	-.043	.493	.245
% of Total Variance	46.19	31.94		40.60	34.10	
% of Common Variance	59.28	40.72		54.38	45.62	

Meta Factor was identical across methods at age 9 (s=1, p<.001) and was essentially the same at age 11 (s=.75, p<.001). Similarly, the Specific Factor was nearly identical across methods at age 9 (s=.82, p<.001) and at age 11 (s=.92, p<.001). These results indicate that the definition of the two factors is not significantly altered by oblique rotation.

The distinctiveness of the Meta and Specific Factors is substantiated by the adherence to simple structure of both orthogonally - and obliquely - rotated factor matrices at both age levels. The *s* index was used to check simple structure within each factor matrix. Perfect sinple structure would be reflected by a value of 0. At age 9 there was a perfect simple structure with oblique rotation (s=0, p=.5), and nearly perfect simple structure with varimax rotation (s=.18, p>.10). Two of the 23 variables loaded on both varimax rotated factors at age 9. At age 11, a perfect simple structure was obtained with oblique rotation (s=0, p=.5) and nearly perfect simple structure with varimax rotation (s=.27, p>.05). Three of the 23 variables loaded on both varimax rotated factors at age 11. The fact that such low *s* values were obtained with both varimax - promax rotation supports the claim that the distinctiveness of the factors is not an artifact of oblique rotation. Interpretation of these results are presented below.

Sentence Ambiguity, Interchangeability of Labels and Word Awareness require the individual to look *at* language abstractly. On the other hand, Auditory Phonological Segmentation and Synthesis and Morphophonological Knowledge Tasks both involve the utilization of specific skills which are presented under the direct instruction of the teacher. Their factor pattern provides support for the hypothesis that these two tasks measure two different processes. The two factors obtained were therefore labeled Generic Meta-linguistic Awareness (Meta) and Specific Skills Related to Reading (Specific), respectively.

It is interesting to note that 4 of the 5 subtests comprising Phonological Segmentation and Synthesis test load on factor II (Specific) for both the 9 and 11 year old groups. Traditionally, researchers have described Phonological Segmentation and Synthesis ability as "meta-linguistic awareness" (Read, 1978), or "metacognitive awareness" (Clark, 1978). However, results of this factor analysis support the idea that these skills involve a number of abilities which some authors have also suggested (Sinclair, Jarvella & Levelt, 1978). The results of the present factor analysis indicate that phonetic segmentation and synthesis might be better characterized as access to linguistic segments rather than meta-linguistic ability. This idea is supported by the present findings in that Auditory Phonological Segmentation and Synthesis generally loaded on a seperate factor distinct from those tasks which may be more clearly considered to be measures of conscious linguistic activity (eg., Sentence Ambiguity, Interchangeability of Labels and Definition of a Word). It seems that Auditory Phonological Segmentation and Synthesis should not be regarded as a task which is highly related to generic meta-linguistic awareness. Rather, it appears that it is part of a language based skill which is learned in school and may not require a high degree of abstract usage and knowledge of language.

A rather surprising finding is evident with the Short-Term Memory Task in that the data demonstrate some inconsistent loadings described at age 9 vs. age 11. Research has emphasized the importance of memory in reading (e.g. Just and Carpenter, 1980; Kleiman, 1975; Levy, 1978). However, "no one has been able to find unequivocal evidence that memory deficits operate as causal factors in reading disability" (Doehring, 1981, p.34). Torgeson (1978-1979) has described the difficulty in determining exactly which single process or combination of processes (eg., encoding, retention, and retrieval) is/are related to memory deficits. However, the results of this factor analysis for both 9 and 11 year olds may suggest that Short-Term Memory may be more related to learned tasks, as defined in factor II, as one becomes older. In contrast, Short-Term Memory may be more related to general language ability for the younger group. These findings may be explained by the attention demand hypothesis of Daneman and Carpenter (1980).

In accordance with the attention demand hypothesis, the greater the demand the more attention one must invest. This decreases selective efficiency which is invariably related to higher demands placed on working memory by the task. The effect would be greatly magnified for poor readers if, in fact, their ability to process syntactic-semantic structures epilinguistically has not reached the level achieved by good readers. In addition, the evidence of increased meta-linguistic awareness, with age and reading ability, may also indicate a greater facility with processing information epilinguistically. Thus, the demands placed on working memory (short-term memory) by the 11 year olds should be less than for the 9 year olds. If such is the case, then it would be expected that Short Term Memory to load on Factor I (defined as Generic Meta-linguistic Awareness) for the 9 year olds but not for the 11 year olds. Evidence for this position can also be abstracted from the correlational data. Short-Term Memory correlates as highly with meta-linguistic tasks as with any other tasks for the 9 year old group. Conversely, since the 11 year old does not "stress" memory to the same degree, Short-Term Memory becomes more related to specific learned tasks. In addition, Kleiman (1975) has suggested that semantic integration of a set of words into an intergraded phrase or sentence is invariably related to holding the words into some type of short term buffer storage in which the information is phonetically encoded. In order to fully comprehend the meaning of the phrase or sentence the individual is required to retrieve from each accessed lexical entry the word's phonological code: "...a representation of the phrase in terms of a sequence of phonological codes which exists in the buffer memory and is operated upon when..." (Coltheart, 1980, p.211) the individual attempts to comprehend the phrase or sentence. If such is the case, then great demands would be imposed on short term memory by Sentence Ambiguity and Auditory Phonological Segmentation and Synthesis. Consequently, short term memory should be highly related to meta-linguistic awareness as well as specific tasks related to reading.

Principal factor and principal component analysis were conducted with total scores for Sentence Ambiguity, Interchangeability of Labels, Auditory Phonological Segmentation and Synthesis, Short Term Memory, Morphophonological Knowledge and Definition of a Word. Definition of a Word was included in the analysis, rather than the total score based on Long, Short and Difficult Word, because the intercorrelations among the latter three subtests were low.

Two factors were extracted and rotated, accounting for 98.2% and 97.0% of the total variance for the 9 and 11 year olds, respectively. These promax- and varimax-rotated factor matrices are presented in Table 9 and Table 10, respectively. The interpretations are based on the promax results since factor intercorrelations are .84 and .74 for age 9 and 11, respectively. These results support the findings for the factor analysis based on subtests. Meta-linguistic tasks form one factor (Meta) while Auditory

TABLE 9
PRINCIPAL FACTOR ANALYSIS WITH PROMAX ROTATION OF TOTAL SCORES

TESTS	9 - YEAR OLDS (N = 170)			11 - YEAR OLDS (N = 170)		
	META	SPECIFIC	h2	META	SPECIFIC	h2
Sentence Ambiguities	.722	.190	.787	.536	.332	.660
Definition of a Word	.502	.007	.258	.861	-.094	.630
Interchangeability of Labels	.464	.094	.297	.520	.090	.347
Auditory Phonological Segmentation and Synthesis	-.001	.820	.671	.029	.756	.606
Short Term Memory	.432	.366	.587	-.043	.731	.489
Morphological Knowledge	.136	.599	.514	.087	.535	.362
% of Total Variance	48.83	49.36		45.19	51.78	
% of Common Variance	49.73	50.27		46.60	53.40	

Correlation among the two primary factors was .740

TABLE 10
PRINCIPAL FACTOR ANALYSIS WITH VARIMAX ROTATION OF TOTAL SCORES

TESTS	9 - YEAR OLDS (N = 170)			11 - YEAR OLDS (N = 170)		
	META	SPECIFIC	h2	META	SPECIFIC	h2
Sentence Ambiguities	.729	.502	.787	.624	.520	.660
Definition of a Word	.447	.242	.258	.749	.262	.630
Interchangeability of Labels	.455	.300	.297	.512	.292	.347
Auditory Phonological Segmentation and Synthesis	.398	.716	.671	.332	.704	.606
Short Term Memory	.559	.523	.587	.587	.256	.651
Morphological Knowledge	.411	.587	.514	.290	.524	.362
% of Total Variance	49.77	48.41		46.26	50.70	
% of Common Variance	50.70	49.30		47.71	52.92	

Phonological Segmentation and Synthesis form a second factor (Specific). Short Term Memory loaded with the meta-linguistic tasks for the 9 year olds and on the alternative tasks for the 11 year olds.

The reader should be cautioned that both principal component analysis and a scree test of the eigenvalues from the principal factor analysis suggested a single factor underlying the total scores for 9 year olds. Loadings on the first unrotated principal factor for each age group are provided on Table 11 to allow the reader to compare one- and two-factor solutions. The decision to extract and interpret two factors was based on the following reasons: 1) This decision allowed more direct comparison of results of the two age groups. 2) The varimax- and promax-rotated second factor accounted for 48.4 and 49.4% of the total variance, respectively. Cattell (1978) has adviced the extraction and rotation of a borderline factor particulaly the boarderline loadings account for a large portion of the common variance.

The high intercorrelations between the Meta-linguistic and Specific Tests Related to Reading factors, whether subtests or total scores were analyzed, strongly suggests the presence of a general factor of reading ability. The existence of such a general factor does not preclude the possibility that two seperate processes contribute to the reading achievement of children. The two processes are reflected in the primary factors labeled Meta and Specific.

TABLE 11
PRINCIPAL FACTOR ANALYSIS WITH VARIMAX ROTATION OF TOTAL SCORES
(6 VARIATIONS)

TESTS	9 - YEAR OLDS (N = 170)		11 - YEAR OLDS (N = 170)	
	META	h2	META	h2
Sentence Ambiguities (Jokes)	.874	.764	.806	.646
Definition of a Word	.488	.238	.705	.497
Interchangeability of Labels	.535	.286	.564	.318
Auditory Phonological Segmentation and Synthesis	.786	.618	.740	.548
Short Term Memory	.766	.587	.649	.421
Morphophonological Knowledge	.705	.497	.584	.341
% of Total Variance	94.26		86.97	
% of Common Variance	100.00		100.00	

The following possible conclusions can be extracted as a result of factor analysis and intercorrelations:

1. The three meta-linguistic measures (Sentence Ambiguity, Word Awareness and Interchangeability of Labels) define one factor which was labeled as Generic Meta-linguistic Awareness (Meta). Thus *hypothesis 1 is accepted.*
2. The three specific tasks denoted to be related to instructional intervention formed the second factor. However, this factor included Short Term Memory only for the 11 year olds. Thus *hypothesis 2 is accepted in full for only the 11 year olds.*
3. The second factor (Specific) was basically defined by Auditory Phonological Segmentation and Synthesis for both age groups. Thus, *hypothesis 2a is accepted.*

Analysis of Reading Ability and its Relationship to Meta-linguistic Awareness and Specific Skills Related to Reading

The relevant hypotheses for this section are as follows:

Hypothesis 3. There will be a main effect for reading ability. The four reading groups will be significantly different from each other on both factors. Superior Readers will have the highest score on each factor, followed by Average, Below Average and Significantly Below Average Readers, in turn.

Hypothesis 4. There will be a significant interaction between factor type and reading level. This analysis is somewhat exploratory and therefore the direction of the interaction is not specified.

The following analysis was conducted to determine whether different reading ability groups can be differentiated on meta-linguistic ability and/or performance on specific tasks related to reading. Factor scores were derived for each age sample from the factor structure matrices corresponding to the pattern matrices in Table 7. The scores on each factor were arbitrarily scaled to means of 50 and standard deviations of 10 for each age group. The means and standard deviation for the factors are presented in Tables 12, 13, 14, and 15. A two-way analysis of variance

TABLE 12
MEANS AND STANDARD DEVIATIONS ON META-LINGUISTIC SCORES FOR 9 - YEAR OLDS

GROUPS	N	MEANS	SD
Superior Readers	50	60.29	5.41
Average Readers	40	50.86	5.37
Below Average Readers	40	48.01	6.72
Signif. Below Average Readers	40	38.27	6.60

TABLE 13
MEANS AND STANDARD DEVIATIONS ON SCORES OF SPECIFIC TASKS RELATED TO READING SCORES FOR 9 - YEAR OLDS

GROUPS	N	MEANS	SD
Superior Readers	50	58.26	2.85
Average Readers	40	52.62	5.53
Below Average Readers	40	48.84	6.84
Signif. Below Average Readers	40	38.22	10.50

TABLE 14
MEANS AND STANDARD DEVIATIONS ON META-LINGUISTIC SCORES FOR 11 - YEAR OLDS

GROUPS	N	MEANS	SD
Superior Readers	50	63.37	3.86
Average Readers	40	47.24	3.66
Below Average Readers	40	43.86	4.05
Signif. Below Average Readers	40	42.20	7.04

TABLE 15
MEANS AND STANDARD DEVIATIONS ON SPECIFIC TASKS RELATED TO READING SCORES FOR 11 - YEAR OLDS

GROUPS	N	MEANS	SD
Superior Readers	50	57.48	5.88
Average Readers	40	52.75	5.81
Below Average Readers	40	45.12	8.62
Signif. Below Average Readers	40	42.79	11.28

was conducted for each age group. Reading comprised the first independent variable, with the four levels of this independent variable. The two factors, Meta and Specific, comprised the two levels of the second independent variable. Thus, the experimental design was a 4x2 ANOVA with repeated measures on the second independent variable (factor). The dependent variables were factor scores for the two factors. The rationale for conducting a two-way analysis of variance, as opposed to two separate one-way ANOVAS on the two sets of factor scores, is that the interaction effect allows the researcher to detect differences across factor in their power to distinguish the reading level groups. Since the overall means on scores on the two factors were scaled to the same value, the main effect for types of factor is meaningless. The main effect for reading groups is of theoretical interest, although its meaningfulness would be limited by a significant interaction.

The summary table for the two-way ANOVAS for age 9 is presented in Table 16. There was a significant main effect for reading level (F=108.336, df=3,166, p<.001). This indicates differences in factor score means among the reading level groups. As expected, because of scaling, the main effect for factor type was nonsignificant. The interaction effect was also nonsignificant, suggesting that the trends in group differences were similar for the two factors.

TABLE 16
TWO WAY ANALYSIS OF VARIANCE ON FACTOR SCORES FOR 9-YEAR OLDS
(TYPE OF FACTOR BY READING LEVEL)

SOURCE	DEGREES OF FREEDOM	MEAN SQUARES	F RATIO	P
A - Reading Level	3	6409.758	108.336	.001
S - Within	166	59.166		
B - Factor Type	1	1.316	0.056	.813
AB - Interaction	3	55.318	2.354	.074
BS - Within	166	23.501		

Type of factor = meta-linguistic vs specific

Post hoc tests were conducted to identify those specific group differences which resulted in the significant group effect. These Post hoc tests were conducted from the group means for individual factors rather than a combination of the factors scores, since individual factors are of greater theoretical interest. Pairwise comparisons between group means were tested with Tukey's multiple range test. The results of these comparisons are provided in Table 17.

The most important features of the pattern of pairwise comparison results are as follows:

1. Superior Readers excel all other groups in meta-linguistic ability. Average and Below Average Readers are not differentiated on meta-linguistic skills but excel Significantly Below Average Readers on this ability.

2. Superior Readers excel all other groups in specific skills related to reading. Average readers excel both of the remaining two groups on specific skills related to reading and Below Average readers excel Significantly Below Average Readers in turn.

3. There are no differences between mean scores on meta-linguistic ability and specific skills related to reading within any one reading group. The parallelism of trends and group differences on each of the two factors is illustrated in Figure 1.

Overall these results indicate that ability in meta-linguistic awareness and specific skills related to reading are differentiated among groups of 9 year-old

TABLE 17
POST HOC COMPARISONS ON FACTOR SCORE MEANS FOR 9-YEAR OLDS (META-LINGUISTIC AND SPECIFIC SKILLS)

GROUPS RANKED	8	4	3	7	2	6	5	1
MEANS	38.22	38.27	48.01	48.84	50.86	52.62	58.26	60.29
8			*	*	*	*	*	*
4			*	*	*	*	*	*
3						*	*	*
7						*	*	*
2							*	*
6							*	*
5								

* P < .05

GROUPS:
1. Superior Readers (Meta-Linguistic Ability
2. Average Readers (Meta-Linguistic Ability)
3. Below Average Readers (Meta-Linguistic Ability)
4. Significantly Below Average Readers (Meta Linguistic Ability)

5. Superior Readers (Specific Skills Related to Reading)
6. Average Readers (Specific Skills Related to Reading)
7. Below Average Readers (Specific Skills Related to Reading)
8. Significantly Below Average Readers (Specific Skills Related to Reading)

FIG. 1

FIG. 1A

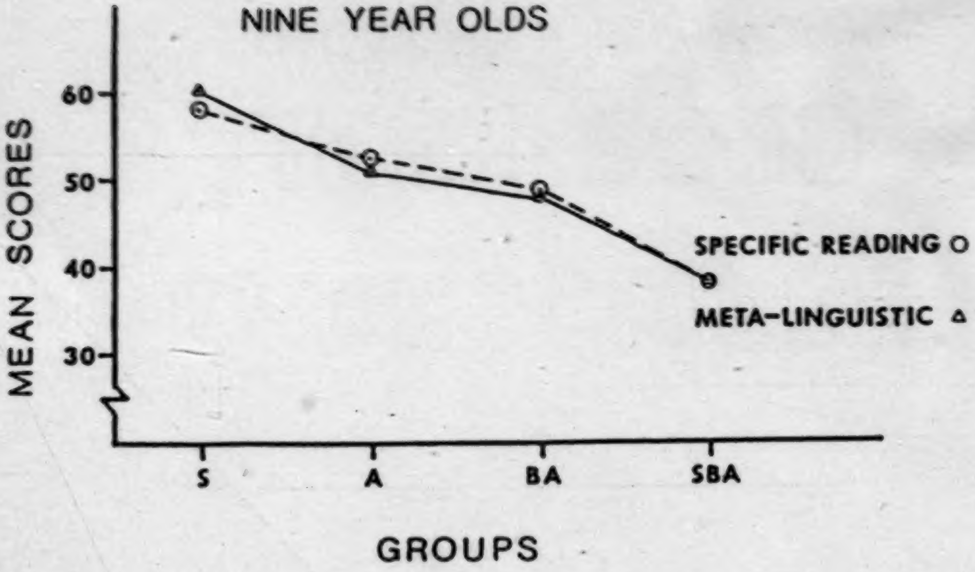
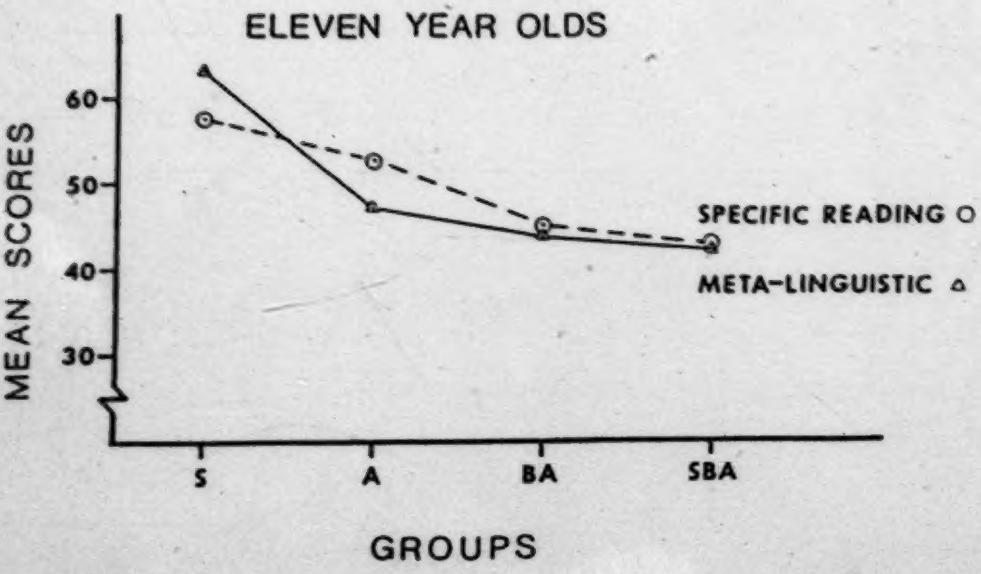


FIG. 1B



Performance on Meta-linguistic and Specific Reading Skills of 4 Reading Level Groups at ages 9 (Fig. 1A) and 11 (Fig. 1B) children of various reading ability levels.

The summary for the two-way ANOVA for age 11 is presented in Table 18. There was a significant main effect for reading level (F=86.891, df=3,166, p<.001). This indicates differences in factor score means among the reading level groups. The effect of factor type was nonsignificant. The interaction between effect for reading level and factor type was significant (F=17.963, df=3,166, p<.001). This indicates that the trends in group differences were not similar across the two factors.

Post hoc tests were conducted to determine the nature of the group x factor interaction. Pairwise comparisons of factor score means were tested with Tukey's multiple range test. The results of these comparisons are provided in Table 19.

The main features of the pattern of pairwise comparison results are as follows:

1. Superior Readers excel Average Readers in meta-linguistic abilities. Average Readers excel both Below Average and Significantly Below Average Readers on this factor. The latter two groups do not differ significantly on this factor.

2. The pattern of group differences in specific skills related to reading is identical to the pattern for meta-linguistic abilities, as described in point 1 above.

3. The mean meta-linguistic ability score for Superior Readers was significantly higher than the group's mean score

TABLE 18
TWO WAY ANALYSIS OF VARIANCE ON FACTOR SCORES FOR 11-YEAR OLDS
(TYPE OF FACTOR BY READING LEVEL)

SOURCE	DEGREES OF FREEDOM	MEAN SQUARES	F RATIO	P
A - Reading Level	3	5435.469	86.891	.001
S - Within	166	62.555		
B - Factor Type	1	11.349	0.438	.509
AB - Interaction	3	465.790	17.963	.001
BS - Within	166	25.931		

Type of factor = meta-linguistic vs specific

TABLE 19
POST HOC COMPARISONS ON FACTOR SCORE MEANS FOR 11-YEAR OLDS (META-LINGUISTIC AND SPECIFIC SKILLS)

GROUPS RANKED	4	8	3	7	2	6	5	1
MEANS	42.20	42.79	43.86	45.12	47.24	52.75	57.48	63.37
4					*	*	*	*
8					*	*	*	*
3					*	*	*	*
7						*	*	*
2						*	*	*
6						*	*	*
5								*

* P < .05

GROUPS:
1. Superior Readers (Meta-Linguistic Ability
2. Average Readers (Meta-Linguistic Ability)
3. Below Average Readers (Meta-Linguistic Ability)
4. Significantly Below Average Readers (Meta Linguistic Ability)

5. Superior Readers (Specific Skills Related to Reading)
6. Average Readers (Specific Skills Related to Reading)
7. Below Average Readers (Specific Skills Related to Reading)
8. Significantly Below Average Readers (Specific Skills Related to Reading)

on specific skills related to reading. In contrast, the mean meta-linguistic ability score of the Average readers was significantly lower than the mean score on specific reading skills for that group. Such within-group differences had not been obtained with the 9 year-old sample. In contrasting direction of these differences for the two reading ability levels suggests that this pattern of results contributed to the significant interaction effect in the main ANOVA for this age group. One further Post hoc test was conducted to test this hypothesis. Differences between the means of Average and Superior Readers were calculated for each meta-linguistic and specific reading skills and these differences were contrasted. The significance of this contrast was tested with Scheffe's test for pairwise comparisons and found to be significant ($F=56.38$, $df=3,166$, $p<.01$). As illustrated in Figure 1B, mean differences between Superior and Average Readers on meta-linguistic abilities are significantly larger than the corresponding difference on specific skills related to reading. These results indicate that Superior Readers are perhaps more strongly differentiated from Average Readers on the basis of meta-linguistic ability than on the basis of specific reading skills.

Examination of the mean on each factor suggested the possibility of an interaction involving the Average and Below Average groups at 11 years of age. To test whether the gap between the groups was larger on the Specific factor than on Meta (meta-linguistic) factor, a Scheffe pairwise comparison was conducted. The results of this comparison was not significant. (F=6.94, df=3,166, p>.05). The significant interaction obtained in the main analysis appears to be solely due to the disordinal interaction involving Superior and Average Readers described above.

The following possible conclusions can be extracted from the results of the statistical analyses: 1)*Hypothesis 3* is partially accepted as the main effect for reading level was significant for both 9 year olds (F=108.336, df=3,166, p<.01) and for 11 year olds (F=86.891, df=3,166, p<.01). The groups were ranked in the order expected but Post hoc analyses indicated no differences between Below Average and Significantly Below Average Readers on the Meta (meta-linguistic) factor at either ages of 9 and 11 years. These two groups (Below and Significantly Below Average Readers) did not differ on specific skills related to reading at age 11.

2)*Hypothesis 4* was rejected at the 9 year level (F=2.354, df=3,166, p>.05). This hypothesis was confirmed for the 11 year olds (F=17.963, df=3,166, p<.01). Post hoc analysis indicated that the separation between factor score means of Superior and Average Readers was greater on the Meta (meta-linguistic) factor than on the Specific (specific skills related to reading) factor.

To provided further clarification of the data a qualitative analysis was conducted examining observations made with respect to the children's verbal responses to the tasks. The following section will provide a brief overview of this data.

Responses to Meta-linguistic tasks

It is felt that children's responses to the meta-linguistic tasks provide an insight into their uderstanding of words and language in general. The tasks, with the exception of the Word Definition Task, required all subjects to provide examples and justification for their responses.

Children's (7 years old SR, 9BA, 9SBA and 11SBA) responses to Short and Long Word appeared to be related to the graphic representation of the signifier. A word is "long" simply as a result of the number of letters it contained, and, conversely, it is "short" because of the number of letters it contains. It is indeed noteworthy that children, prior to dichotomizing the word/referent relationship, accompany their justifications with restrictions which focus upon the quantitative aspect of the referent. For example:

What is a long word? (question phrased to a 7 year old SR).

Response: *ENCYCLOPEDIA*

Question: **Why is encyclopedia a long word?**

Response:

> *BECAUSE IT HAS LOTS OF LETTERS 5 OF THEM EN - CY - CLO - PE - DIA. AND BECAUSE THE ENCYCLOPEDIA HAS SO MANY BOOKS AND SO MUCH INFORMATION THAT IT TAKES A LONG TIME TO LEARN.*

It seems that these children are at the transition stage of dichotomizing or differentiating words from the physical reality they represent. By contrast, the 9 year old SR, 11 year old SR and 11 year old A reader's facility and higher level understanding of words is perhaps best exemplified by the following play on words:

Question: **Can you give an example of a long word:**

Response: *SMILE*

Question: **Why is smile a long word?**

Response: *BECAUSE IT HAS A MILE AT THE END.*

Children were also requested to provide examples of difficult words and to justify their answer.

Question:**Difficult word:** The (7SR, 9BA, 9SBA, 11SBA) childrens' responses are based on the fact that they are experiencing difficulty in spelling words. For example:

Response: *BELL, I ALLWAYS FORGET TO PUT 2 'Ls'.*

While this is a very justifiable explanation, it is related to the individual's ability and may not related to the complexity of the word itself. However, the complexity of the task relative to the individual's skills and abilities must be comsidered.

The higher ability groups (9SR, 9A, 11SR, 11A) provided higher order justifications by using grammatical terms and demonstrated an understanding that these terms are part of subsets. For example:

Question: **What is a difficult word:** (9 year old SR)

Response:*PNEUMONIA ... IT IS DIFFICULT TO SPELL BECAUSE THE FIRST SYLLABLE "P" IS SILENT AND THE SECOND VOWEL "U" IS ALSO SILENT.*

Question: **What is a difficult word: (11 year old SR)**

Response: *WORDS LIKE "RETURNED" BECAUSE THEY CAN BE USED AS ADJECTIVES OR VERBS.*

Question: **can you give me an example?**

Responses: *ADJECTIVE: THE RETURNED BOOK SAT ON HIS DESK*

VERB: HE RETURNED THE BOOK TO THE LIBRARY.

Inconsistencies are again observed within the 9 year old SR and the 9 year old A readers. In their definition of a word their responses seemed to be more abstract than those of the 7 year old SR. Nevertheless, remnants of concreteness were observed. By contrast, their performance on Long, Short and Difficult Word tasks indicated a considerable degree of linguistic sophistication. These differences could be explained by the characteristic nature of the questions themselves. The question *"WHAT IS A WORD"* is a very abstract and difficult question. In fact, in a personal communication, Dr. Peter Bryant (1982) reported that a philosopher at Oxford University had difficulty in providing a definition of a word. Providing examples of a Long, Short and Difficult word in comparison to defining a word, is a much easier task since it is less open ended, more concrete and taps physical attributes of words. Justifications for the chosen word can be abstracted from learned information. These observations provided added justifications for the previously stated notion that these tasks are not pure measures of generic meta-linguistic awareness.

A further aspect worthy of comment is the performance of the three Superior Reading groups on Definition of a Word Task and Intercheangability of Labels Task. These two tasks require the individual to look *at* language, to *know* and not just *respond* and to use language abstractly. The responses of the 7 and 9 year olds SRs did not appear to differ significantly. Their responses on the whole tended to be somewhat unanalyzed, iconic and situational bound. Both groups offered as a definition of a word *"MEANING: A WORD MEANS SOMETHING* or *A WORD TELLS YOU SOMETHING."* These children rejected articles and other functors as examples of words since *"THEY DON'T MEAN ANYTHING."* Similarly, when asked to respond to the question: *suppose someone was making up names for things, could he then call the sun THE MOON and the moon the SUN?* The majority of the 7 year olds responded with: *"NO....BECAUSE THE MOON DOES NOT SHINE LIKE THE SUN."* When asked *what would night look like* their answer was invariably *"BRIGHT"*. By way of contrast, the 9 year old SR responded to the first question with such affirmative responses as *IF YOU WANT TO, I GUESS IT'S OK. BUT YOU REALLY SHOULD NOT BECAUSE THEY ALREADY HAVE NAMES* or *IT'S OK IF YOU'RE AN INVENTOR* or *IT'S OK TO JUST PRETEND*. However, their responses to *what would night look like* was also *BRIGHT*. It appears that the concept of 'wordness' is more crystallized in the 9 year old SR than in the 7 year old SR. However, when the 9 year old was placed in a decision making process which violated their experiences (e.g., attributes of night vs attributes of day) they fell into the trap of not being able to seperate the name of the object from its attribute. As Vygotsky (1962) has noted "they cling to the name when it is transferred like possessions following their owner" (p.129). Vygotsky's hypothesis is perhaps best exemplified by a 9 year old's SBA response to the question ....**could he then call a cat a dog and a dog a cat**, was *"NO OF COURSE NOT! THE CAT WOULD THEN HAVE TO CHASE THE DOG."* Again, as evidenced above the 7 year olds, similar to the 9 year old SBA readers are yet unable to appreciate the semantic structure of a word since they have difficulty in distinguishing between referent and meaning. By way of contrast, the 9 year old Superior Readers have to some extent overcome this difficulty. The concepts for them are evolving but are not fully at their command.

The 11 year olds,(SR) on the other hand, appear to have overcome this difficulty and can treat words abstractly and symbollically. For example, in defining words they offered the following: *WORDS ARE PART OF A SENTENCE AND WITHIN THE SENTENCE THEY HAVE MEANING LIKE.. IT.. THE.. ETC...WORDS ARE ALSO PART OF GRAMMAR (ADJECTIVES, NOUNS, ADVERBS, PREPOSITIONS, ARTICLES ETC...WORDS PROVIDE INFORMATION AND DISCRIPTIONS OF THINGS. THEY HELP US TO COMMUNICATE. WORDS ARE MADE UP OF LETTERS......SOME ARE VOWELS AND SOME ARE SYLLABLES*. As can be seen, words have become more differentiated, abstract and *opaque* at this age. Similar findings have also been reported by Berthoud -

Papandropoulou (1978). However, the Average readers were not able (generally speaking) to provide such an all encompassing definition. The general trend was to provide a defination such as: *WORDS GIVE MEANING, YOU CAN WRITE WITH THEM AND MAKE SENTENCES, YOU CAN SPEAK WITH THEM. WORDS ARE USED FOR GRAMMAR.*

Question: **is the a word?**

ANSWER: after a long pause *YES, BECAUSE IT'S AN ARTICLE.*

The SBA and BA readers seldom provided parsimonious definitions and basically gave meaning as a definition.

Intuitive knowledge of spoken language and comprehension of that language is highly related to academic success and in particular to reading. This is based on the idea that schooling is primarily a reading processs and reading is a language oriented skill (Vellutino, 1978). In addition, language is the primary medium in which teachers teach and children learn. Therefore, unless the individual possesses the necessary linguistic skills to understand language, schooling may be fruitless. Flood and Salus (1982) suggest that "Less obvious is the fact that the ability to think and talk about language (a meta-linguistic task) is critical to successful academic achievement in terms of learning and providing evidence of this learning" (p.57).

If the reading process is related to the process of consciously manipulating the different categories and relations in language (a meta-linguistic ability) and if reading requires the individual to stand back and analyze language objectively (Menyuk and Flood, 1981) then awareness of Ambiguities in Sentences, Word Definition and Intercheangability of Labels must also play a role in reading acquisition. After all, a pre requisite of reading can be thought of as a meta-linguistic process in which the individual is required to extract information from visually presented materials. In addition, if the ability to read is invariably related to complete relations between the "psycholinguistic processing of printed materials and oral syntactic meta-linguistic abilities , then, diferrences in these abilities could account for the differences in reading achievement among children" (Flood and Salus, 1982, p. 61).

It was noted, from the observational data, that the amount of time required to respond and obtain a correct response increased as the ability level decreased. In addition, it was also noted that the amount of qualitative information (precise and to the point), decreased as a function of lower ability levels. The following example is indicative of the type of responses provided by poor readers (9 year old Significantly Below Average):

Question:*WHAT SIGNS SHOULD BE USED IN A FROZEN FOOD DEPARTMENT?*

THE BEST FOODS YOU EVER THAW.

Response: **FROZEN FOOD DEPARTMENT, I GUESS THAT'S A PLACE LIKE SAFEWAY, YOU KNOW WHERE YOU FIND ICE CREAM, AND PIZZA. I REALLY LIKE MAC CAINS PIZZA, THEY PUT A LOT OF STUFF ON THEIR PIZZA LIKE LOTS OF CHEESE.**

Question:*THAT'S RIGHT BUT WHAT DOES THE JOKE MEAN?*

Response: **WHAT WAS THAT JOKE AGAIN?**

The joke was repeated.

Response: **THE FOOD IN A FROZEN FOOD DEPARTMENT IS FROZEN AND IF THE FRIDGES BREAK THE FOOD WILL THAW. RIGHT? OH! WAIT A MOMENT, SAW AND THAW ARE ALMOST THE SAME THEY SOUND ALIKE. NO, THE JOKE WAS NOT THAT FUNNY.**

The 11 year old Significantly Below Average Readers responses were not as embellished with irrelevant information, as were their 9 year old counterparts. Nevertheless the responses were not as precise and parsimonious as those of the 11 year old Superior Reader.

For example: **THAW AND SAW ARE VERY SIMILAR SOUNDING WORDS, IT'S A PLAY ON WORDS.**

In summary, it seems that the lower ability groups utilize a strategic behavior of trial and error which finally lead to success. These results suggest that meta-linguistic abilities are present in the lower ability groups but may not be as 'automatized' as in the higher ability groups. The lower ability groups may lack the awareness of how to employ, immediately, appropriate resources or strategies in order to obtain the ultimate response or level of performance. This hypothesis has received considerable attention and consistency in its findings dealing with memory (Brown, 1975; Chi, 1976) and meta-linguistic awareness (Hakes, 1980). The result of the above studies indicate that over the course of development, increased performance is related to more effective use by the individual, of his limited resources via greater awareness and more efficient use of strategies for efficient information processing (Chi, 1976; Dennis, 1982; Forrester and Waller,1976). It is important to emphasize that all of the tasks adopted in this study were orally presented and thus they emphasize oral language processing (listening/speaking). This mode of presentation, coupled with the fact that they were allotted as much time as required, might have afforded the poor readers with the opportunity to employ what ever meta-linguistic ability they possess in order to provide the appropriate judgement or response. Similar findings have also been reported by Menyuk and Flood (1981).

V. General Discussion

The present study attempted to identify the factors underlying a group of tasks which measured skills believed to be important to reading. Tests believed to measure meta-linguistic ability and specific skills related to reading appeared on separate factors, labelled Generic Meta-linguistic Ability and Specific Skills Related to Reading, for both 9 and 11 year-old children. However, the evidence for the significance of a separate meta-linguistic factor was much weaker at the 9 year-old level than at the 11 year-old level. In fact, there was direct evidence from principal component analysis on total scores for a single general factor underlying reading abilities.

This study indicates that researchers need to be more cognizant of the tasks they use to measure meta-linguistic awareness. For example: Auditory Phonological Segmentation and Synthesis, which has been used as a meta-linguistic task since it requires the child to think about the language he/she uses unconsciously everyday, was found to be a poor measure of generic meta-linguistic awareness. Thus, tasks should be analyzed, age and different ability levels should be considered.

Within the context of this study, the results indicate that two distinct factors emerged - a Meta and a Specific factor especially for the 11 year old group. This seems to suggest that meta-linguistic awareness is not just an all encompassing process, with respect to reading, but is rather a cognitive construct which interacts with other cognitive activities with which it can modify. Thus, it can be modified and can modify other cognitive activities. In addition, a significant interaction was found between the 11 year old Superior and Average readers. It seems that for the 9 year old both meta-linguistic abilities and knowledge of specific skills are necessary for reading.

The 11 year old Superior and Average readers were differentiated only by meta-linguistic ability. This may suggest that meta-linguistic ability is perhaps important not only for acquiring reading but also for a higher conceptual level in reading such as comprehension. Thus, meta-linguistic awareness, for this age group, would be more related to the 'how' and the the 'why' of certain interactions. This, of course, does not imply that younger children are incapable of interpreting the 'how' and the 'why' relationships. Perhaps younger children are more concerned with the 'how' and the 'why' of specific actions and not so concerned with certain interactions (Sinclair, 1978).

Factor scores on both the meta-linguistic and specific skills factors were able to discriminate children of various levels of reading comprehension abilities. At the 9 year level, the trend on factor score means of Superior, Average, Below Average, and Significantly Below Average Readers reflected an almost linear relationship between reading comprehension and each of meta-linguistic ability and specific skills related to reading. These two factors do not differ in their ability to discriminate among reading levels, as reflected by the lack of a significant interaction in the factor type by reading level ANOVA for 9 year-olds. In contrast, the significant interaction on the corresponding ANOVA for 11 year-old children reflect differences in the power of these factors to discriminate children of various levels of reading ability. Superior Readers could be more clearly seperated from Average Readers by meta-linguistic abilities than by specific skills related to reading. A tentative interpretation of the differences and results obtained for the two age groups is provided below.

The stronger evidence for the significance of a separate meta-linguistic factor and it superior power in discriminating between Superior and Average Readers at age 11 may reflect over learning and automaticity of the specific skills at that age level and/or cognitive maturation leading to the refinement of meta-linguistic skills of Superior Readers. In other words, children's performance on such specific tasks such as pluralizing a word may become automatized. In contrast children's cognitive capability for such abstract tasks as the meta-linguistic tasks become refined and increasingly differentiated as age increases. The rationale for this interpretation is as follows: Both specific skills and meta-linguistic abilities are related to reading at both age levels as reflected by group differences on both factors at both age groups. However, the variance in reading ability may be more strongly influenced by variance in meta-linguistic abilities than by variance in specific skill at age 11. Evidence for a stronger role played by meta-linguistic abilities is supplied by the significant interaction between factor type and reading level. Support for the above interpretation is available from Messik (1972). He argued that complex tasks involve a number of components and abilities which may be executed sequentially throughout task performance. That is to say that some components are more difficult to master than other components and are thus mastered at later ages. The importance of ability on any one particular component to ability on the complex task, may change as a function of practice or exposure to the component task. This phenomenon has been demonstrated in regards to the importance of applying chunking strategies to memory span tasks (Dempster, 1981) and the relative importance of visualization and physical or motor co-ordination to performance on psychomotor tasks (Fleshman, cited in Messik, 1971).

The above interpretation of results of the present study can only be offered as hypotheses to be tested by further research. These hypotheses cannot be tested directly by the procedures used in the present study. These procedures were all essentially correlational. Consequently, causal statements about the effect of development of abilities on component skills cannot be made. Factor analysis is a procedure for simplifying patterns of correlations among variables.

Messik (1972) has argued that whereas factor analysis is valuable for identifying ability of personality traits it is not capable of specifying the nature of the trait. He has suggested that factor interpretation may be aided by multivariate studies in which factors or traits are experimentally manipulated. In fact, Royer (1963) has suggested that one can either manipulate the factors or traits directly as independent variables or indirectly as dependent variables via manipulation of a true independent variable.

Further research should attempt to examine the above presented hypothesis regarding meta-linguistic skills through further experimental manipulation of meta-linguistic abilities and specific skills related to reading.

Prior to experimentally manipulating meta-linguistic awareness and specfic tasks related to reading a number of condiderations should be addressed:

1) Research should endevour to task analyze any experimental tool , or task utilized to measure meta-linguistic awareness. This process should facilitate not only an indepth understanding of meta-linguistic awareness but also assist in determining the degree to which meta-linguistic awareness is being measured. In addition this procedure should assist in controlling for or

understanding any extraneous variables.

2) With due regard to extraneous variables or covarying factors it would be useful to investigate the influence of formal and informal educational experiences on meta-linguistic awareness.

3) In order to specifically determine the relationship between meta-linguistic awareness and reading, a systematic investigation would require training in meta-linguistic awareness. This procedure, while adopting appropriate methodological approaches, would permit a greater understanding into the experimental variables and how they are related to the performance characteristics on various intellectual tasks (e.g., reading comprehension, understanding expressive and receptive language).

4) An additional area worthy of exploration is to examine meta-linguistic awareness within different ages in both "normal" and exceptional populations. Untill there is evidence of a definite relationship between reading and meta-linguistic awareness and evidence for a wide-spread application of meta-linguistic skills the application of the concept meta-language would seriously be called into question.

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APPENDIX A: DESCRIPTION OF TASKS

WORD AWARENESS TASK

Q. 1) CAN YOU TELL ME WHAT A WORD IS?

Q. 2) CAN YOU TELL ME A WORD THAT IS LONG?

Q. 3) WHY IS (the name of the word the child said) A LONG WORD?

Q. 4) CAN YOU TELL ME A WORD THAT IS SHORT?

Q. 5) WHY IS (the name of the word the child said) A LONG WORD?

Q. 6) CAN YOU TELL ME A WORD THAT IS DIFFICULT?

Q. 7) WHY IS (the word the child said) A DIFFICULT WORD?

INTERCHANGEABILITY OF WORDS TASK

Q. 1) SUPPOSE SOMEONE WAS MAKING UP NAMES FOR THINGS COULD HE THEN CALL THE SUN *THE MOON* AND THE MOON *THE SUN*? WHY OR WHY NOT?

Q. 1A) WHAT WOULD NIGHT LOOK LIKE?

Q. 2) SUPPOSE SOMEONE WAS MAKING UP NAMES FOR THINGS COULD HE THEN CALL A CAT *A DOG* AND A DOG *A CAT*. WHY OR WHY NOT?

Q. 2A) WHAT SOUND WOULD A CAT MAKE?

Q. 3) SUPPOSE SOMEONE WAS MAKING UP NAMES FOR THINGS COULD HE THEN CALL A BOOK *A CHAIR* AND A CHAIR *A BOOK?* WHY OR WHY NOT?

Q. 3A) WHAT WOULD A BOOK LOOK LIKE?

Q. 4) SUPPOSE SOMEONE WAS MAKING UP NAMES FOR THINGS COULD HE THEN CALL A LAKE *A TREE* AND A TREE *A LAKE*. WHY OR WHY NOT?

. WHAT WOULD A TREE LOOK LIKE?

INSTRUCTION FOR THE "JOKE" TEST

I HEAR YOU LIKE JOKES. IS THAT TRUE? If yes say GOOD. If no is the answer say WELL I HAVE SOME GOOD ONES. WOULD YPOU LIKE TO HEAR THEM. Encourage the child to participate. SOME PEOPLE HAVE TOLD ME THAT SOME OF THE JOKES ARE VERY GOOD AND THAT SOME OF THEM ARE REALLY BAD. I CANNOT TELL WHICH ARE THE GOOD ONES AND WHICH ARE THE BAD ONES. I NEED YOUR HELP. WOULD YPOU LISTEN TO THE JOKES AND TELL ME IF YOU THINK IT'S REALLY FUNNY, A LITTLE FUNNY OR NOT FUNNY AT ALL?

At this point the child is given an example. *WHY DID THE CHICKEN CROSS THE STREET. WELL IT WANTED TO GET TO THE OTHER SIDE*. WAS THIS JOKE VERRY FUNNY, A LITTLE FUNNY OR NOT FUNNY AT ALL?

OK. NOW HOW WOULD YOU EXPLAIN THIS JOKE TO SOMEONE WHO DOESN'T GET IT? After the child responds say OK. DO YOU UNDERSTAND HOW WE DO IT? REMEMBER THIS IS NOT A TEST, I REALLY NEED YOUR HELP. ARE YOU READY?

At this point procede with item # 1 of the test and continue. Aloow the child all the time he/she requires.

PHONOLOGICAL AMBIGUITIES

Those cases in which two words share similar phonetic representation, but in which the words differ on at least one phonetic demention. The two words can differ in any of the following respects: different stress; different intonation; different initial, middle of final consonant clusters; different initial, middle or final vowel sounds (*trees/trays*); and addition or deletion of a phoneme or of a phoneme cluster (*hamburglar*). (The following list is restricted to differences in the initial, middle or final consonants or consonant clusters so as to prevent any intraclass interference). A. Bob coughed until his face turned blue.

-- *Was he chocking?*

No, he was serious.

B. What signs should be used in a frozen food department?

-- *The best foods you ever thaw.*

C. What did the mother ghost say to the baby ghost?

-- *Fasyten your sheet belt.*

D. I'll bet you can't tell me what a twip is.

-- *A twip is a ride on a train.*

E. How are doing with your wood carving?

-- *Oh, it's coming whittle by whittle.*

F. *How far can a spook travel?*

-- *From ghost to ghost.*

G. What is a good way to get a dog off the street?

-- *Put him in a barking lot*

H. Knock Knock

-- *Who'se there? Adolf.*

-- *Adolf who? A dolf ball hit me in the mouth.*

I. If you put three ducks in a box, what do you have?

-- *A box of quackers.*

J. What do you use to treat a pig with a sore throat?

-- *Oinkment.*

LEXICAL AMBIGUITY

Those cases in which the ambiguity rests in the dual interpretation of a single word or group of words There seems to be two classes of lexical ambiguity which affect perception time; those which have systematic relation to one onother and those which do not. For example: *The captain enjoyed his new position,* representing his former type, with, *The bark frighttened him* representing the latter where *bark* used in this context has no relation to the bark of a tree.

As a control here, only examples of the latter will be used -- words which seem to have distinct lexical entries.

A. How can hunters in the woods best find their lost dogs?

-- *By putting their ears to a tree and listening to the bark.*

B. Why isn't your nose twelve inches long?

-- *Because then it would be a foot.*

C. Did you hear about the man who wore a winter coat to a baseball game because he heard that all the fans would be there?

D. Eye Doctor: Eye's checked?

-- *Betsy: No, they are blue.*

F. What do you do if you smash your toe?

-- *Call a tow truck.*

G. Customer: What are these pennies doing in my soup?

-- *WAITER: Well sir, you said that you would stop eating here if there wasn't some change in your meal.*

H. How do we know that there was fruit on Noah's Ark?

-- *Because the animals came in pairs.*

I. What is the biggest diamond in the world?

-- *A baseball diamond.*

J. MOVIE DIRECTOR TO ACTOR: Do you have any experience in acting?

-- *ACTOR: Sure, my leg was in a cast once.*

K. CUSTOMER IN A SHOP: This record has a dent in it.

-- *CLERK: Then it must have been a hit record.*

L. When is a piece of wood like the king of England?

When it's a ruller.

SURFACE STRUCTURE AMBIGUITIES

Those ambiguities caused by the manner in which the words of a sentence are grouped into phrases.

A. How would you run over a dinosaur?

-- *I'd start at his tail, run up his back, then over his neck and I'd jump off.*

B. Where would you go to see a man - eating fish?

A seafood restaurant.

C. CLERK: May I help you madame?

-- *WOMAN: Have you any wallpaper that I can put on myself?* CLERK: No, Ma'am we only have wallpaper that you can put on walls.

D. Why is a bananna like a sweater?

-- *Because you can slip on it.*

E. When my father went hunting last year, he shot a bear in his pajamas. But, I can't figure out how the bear got into my father's pajamas.

F. Do you have any stamps that I can put on myself?

-- *CLERK: We only have stamps that you can put on letters.*

DEEP STRUCTURE AMBIGUITIES

Those ambiguities which arise due to a single surface representation for two deep structures.

A. They tell me that your son is quite an author - and still in college. Does he write for money?

-- Indeed yes, in every letter.

B. LIBRARIAN: Please be quiet the people near you can't read.

-- SMALL BOY: Why they ought to be ashamed of themselves! I've been able to read since I was six.

C. I had my radio on last night.

-- Did it fit?

D. This woman's son was away in the army and rote her that he had grown another foot. And she knit him another sock.

E. TEACHER: Billy, you missed school yesterday, didn't you?

-- BILLY: Not a bit.

F. God bless America.......

-- Did it sneeze?

G. My father makes faces all day.

-- Why does he do that? Because he works in a clock factory.

H. Will you join me in a bowl of soup?

-- Do you think ther's room for both of us?

I. Did you take a bath today?

-- No, is there one missing?

J. We're going to have a preature for Thanksgiving.

-- *You are? Well, we're going to have a turkey.*

K. MOE: Did you hear what happened at Woodwards?

-- *JOE: Na! What happened?* MOE: A boy broke a window with his little brother.

-- *JOE: Oh my, was the little boy hurt?*

MORPHEME SEGMENTATION PROBLEMS with no phonetic distortion.

Those ambiguities which are caused by a separation of a compound syllabic structure into its components or by fusion of two or more morphemes into a compound syllabic structure. Separation and combination yield the phonetic effects of different stress patterns, intonation and time intervals.

A. What did the Indian boy say when his dog fell off the cliff?

-- *Why doggone of course.*

B. What did one hat say to the other hat?

-- *You stay here, I'll go on ahead.*

C. Did you ever stand on a pet?

-- *Stand on a pet? I should say not.* I have, on a carpet. D. Why did the little girl go to the football game? Because she thought that the quarterback would make her rich.

E. Why can one never starve in the desert? Because of the sand which is there.

F. What do you call a cat who drinks lemonade?

-- *A sour puss.*

G. How do trains hear?

-- *Through their engine ears.*

H. What is the difference between a tunafish and a piano?

-- *You can tune a piano, but you can't tune a fish.*

I. Who was the father of all jokes?

-- *Popcorn.*

J. Why is that dog running in a circle?

-- It's a watchdog, and it's winding itself up.

K. Did you hear about the boy who sat in the living room because he thought that he was dying.

INSTRUCTION FOR THE SHORT TERM MEMORY TASK

I'M TO SAY SOME SENTENCES, LISTEN CAREFULLY, AND WHEN I AM THROUGH SAYING YHR SENTENCES I'D LIKE YOU TO REPEAT IT EXACTLY AS I SAID IT. OK? FOR EXAMPLE IF I SAY *THE LITTLE GIRL RAN AWAY* WHAT WOULD YOU SAY? If the child responds correctly say THAT'S RIGHT. NOW LISTEN CAREFULLY BECAUSE I'M GOING TO SAY OTHER SENTENCES. READY? At this point procede with the test items.

However, if the child fails the example say: LISTEN CAREFULLY st WHAT DID I SAY?

Whether the child suceeds or fails the second example procede to ITEM 1 of the test. Give no help on the second example or any of the test items.

SHORT TERM MEMORY TASK

7. Pretty shining raincoats attract children.(MS)
8. Cats closed stop doors some.(RW)
9. Pastry foxes many open worry. (UW)
10. Serious public raindrops debate houses. (SA)
11. Empty bottles litter public highways. (MS)
12. Nervous apples watch greasy kites. (AS)
13. Progress fathers hamper many backwards. (RW)
14. College outside happy supply easy. (UW)
15. Carry helpful many empty rabbits. (UW)
16. Pupils teachers disturb noisy sincere. (RW)
17. Many college students study language. (MS)
18. Worried sunny pastry supplies children. (AS)
19. Relax mornings workers pleasant Sunday. (RW)
20. Parties rivers litter feeling houses. (UW)
21. Empty smokers consult foolish gardens. (AS)
22. Open markets attract many flies. (MS)

INSTRUCTION FOR THE MORPHOPHONOLOGICAL TEST

I'M GOING TO SHOW YOU SOME PICTURES. The experimenter will show the appropriate picture(s) and read the appropriate text. the child should be encouraged to provide thr necessary responses and *the responses will be recorded phonetically* EXAMPLE # 1.

THIS IS A WUG. NOW THERE IS ANOTHER ONE. THERE ARE TWO OF THEM. THERE ARE TWO........... If the child does not respond corectly say LETS US SEE. ONE OF THESE (pointing at the bird like picture) IS CALLED A WUG. WHAT DO YOU SUPPOSE WE CAN CALL TWO OF THEM. If the child still does not understand after some help procede to item # 2. If again he fails the item go to item # 3. If this item is also failed stop testing and note the reason(s). If the child passes this otem continue testing.

MORPHOPHONOLOGICAL KNOWLEDGE TASK

1)*Plural. One bird like animal, then two.* THIS IS A WUG /Wag/. NOW THERE IS ANOTHER ONE. THERE ARE TWO OF THEM. THERE ARE TWO

2)*Plural.One bird then two. THIS IS A GUTCH /GAC/. NOW THERE IS ANOTHER ONE. THERE ARE TWO OF THEM. THERE ARE TWO*

3)*Past Tense. Man with a steaming pitcher on his head.* THIS IS A MAN THAT KNOWS HOW TO SPOW /SPOW/. HE IS SPOWING. HE DID THE SAME THING YESTERDAY. WHAT DID HE DO YESTERDAY. YESTERDAY HE

4)*Plural. One animal then two.* THIS IS A KAZH /KAEZ/. NOW THERE IS ANOTHER ONE. THERE ARE TWO OF THEM. THERE ARE TWO

5) *Past Tense. Man swinging an object.* THIS IS A MAN THAT KNOWS HOW TO RICK /RIK/. HE IS RICKING. HE DID THE SAME THING YESTERDAY. WHAT DID HE DO YESTERDAY. YESTERDAY HE

6) *Diminutive & compound or derived word. One animal, then a miniscule animal.* THIS IS A WUG. THIS IS A VERY TINY WUG. WHAT WOULD YOU CALL A VERY TINY WUG? THIS WUG LIVES IN A HOUSE (pointing at the large wug). WHAT WOULD YOU CALL A HOUSE THAT A WUG LIVES IN?

7) *Plural. One animal then two.* THIS IS A TOR /TOR/. NOW THERE IS ANOTHER ONE. THERE ARE TWO OF THEM. THERE ARE TWO

8) *Derived adjective. Dog covered with irregular green spots. THIS IS A DOG WITH QUIRKS ON HIM. HE IS ALL COVERED WITH QUIRKS. WHAT KIND OF DOG IS HE? HE IS A*

Plural. One flower then two. THIS IS A LUN /LAN/. NOW THERE IS ANOTHER ONE. THERE ARE TWO OF THEM. THERE ARE TWO

10) *Plural. One animal then two.* THIS IS A NIZ. NOW THERE IS ANOTHER ONE. THERE ARE TWO OF THEM. THERE ARE TWO

11) *Past Tense. Man doing calisthenics.* THIS IS A MAN THAT KNOWS HOW TO MOT /MAT/. HE IS MOTTING. HE DID THE SAME THING YESTERDAY. WHAT DID HE DO YESTERDAY. YESTERDAY HE

12) *Plural. One bird then two.* THIS IS A CRA /KRA/. NOW THERE IS ANOTHER ONE. THERE ARE TWO OF THEM. THERE ARE TWO

13) *Plural. One animal, then two. THIS IS A TASS. NOW THERE IS ANOTHER ONE. THERE ARE TWO OF THEM. THERE ARE TWO*

14) *Past Tense. Man dangling an object on a string. THIS IS A MAN WHO KNOWS HOW TO BOD. HE IS BODDING. HE DID THE SAME THING YESTERDAY. YESTERDAY HE*

15) *Third person singular. Man shaking an object.* THIS IS A MAN THAT KNOWS HOW TO NAZ. HE IS NAZZING. HE DOES IT EVERY DAY. EVERY DAY HE

16) *Plural. One insect, then two.* THIS IS A HEAF /HIYF/. NOW THERE IS ANOTHER ONE. THERE ARE TWO OF THEM. THERE ARE TWO

17) *Plural. One glass, then two.* THIS IS A GLASS. NOW THERE IS ANOTHER ONE. THERE ARE TWO OF THEM. THERE ARE TWO

18) *Past Tense. Man exercizing. THIS IS A MAN WHO KNOWS HOW TO GLING. HE IS GLINGING. HE DID THE SAME THING YESTERDAY. WHAT DID HE DO YESTERDAY? YESTERDAY HE*

19) *Third Person Singular. Man holding an object.* THIS IS A MAN WHO KNOWS HOW TO LOODGE /LUWDZ/. HE IS LOODGING. HE DOES IT EVERY DAY. EVERY DAY HE

20) *Past Tense. Man standing on the ceiling..* THIS IS A MANW WHO KNOWS HOW TO BING. HE IS BINGING. HE DID THE SAME THING YESTERDAY. WHAT DID HE DO YESTERDAY? YESTERDAY HE

21) *Singular and Plural Possessive. One animal wearing a hat, then two wearing hats. THIS IS A NIZ WHO OWNS A HAT. WHOSE HAT IS IT?.................... HAT. NOW THERE ARE TWO NIZZEZ. THEY BOTH OWN HATS. WHOSE HATS ARE THEY? THEY ARE THE ....HATS.*

22) *Past Tense. A bell. THIS IS A BELL THAT CAN RING. IT IS RINGING. IT DID THE SAME THING YESTERDAY. WHAT DID IT DO YESTERDAY? YESTERDAY IT*

23) *Singular and Plural Possessive. One animal wearing a hat then two.* THIS IS A WUG WHO OWNS A HAT. WHOSE HAT IS IT? IT IS THE....................HAT. NOW THERE ARE TWO WUGS. THEY BOTH OWN HATS. WHOSE HATS ARE THEY? THEY ARE THE ....HATS.

24) *Comparative and Superlative of the adjective. A dog with a few spots, one with several, and one with a great number.* THIS DOG HAS QUIRKS ON HIM. THIS DOG HAS MORE QUIRKS ON HIM. AND THIS DOG HAS EVEN MORE QUIRKS ON HIM. THIS DOG IS QUIRKY. THIS DOG IS.................... AND THIS DOG IS THE

25) *Progressive & Derived Agentive or Compound. Man balancing a ball on his nose.* THIS IS A MAN WHO KNOWS HOW TO ZIB. WHAT IS HE DOING? HE IS............... WHAT WOULD YOU CALL A MAN WHOSE JOB IS TO ZIB

26) *Past Tense. An ice cube then a puddle of water. THIS IS AN ICE CUBE. ICE MELTS. IT IS MELTING. NOW IT IS ALL GONE. WHAT HAPPENED TO IT? IT*

27) *Singular and Plurar Possessive. One animal wearing a hat then two.* THIS IS A BIK WHO OWNS A HAT. WHOSE HAT IS IT? IT IS THE .... HAT. NOW THERE ARE TWO BIKS. THEY BOTH OWN HATS. WHOSE HATS ARE THEY? THEY ARE THE.................... HATS.

INSTRUCTION FOR THE AUDITORY PHONOLOGICAL SEGMENTATION AND SYNTHESIS TASK

To explain this test the examiner will first show the child the top half of a sheet of 8.5 x 11 inch paper on which the picture of a COW and a BOY'S HEAD has been drawn side by side. The experimenter akes the child to say *COWBOY*. After the child responds, the examiner covers the picture of the picture of the boy's head and says NOW SAY IT AGAIN BUT WITHOUT THE BOY. If the response is correct *COW* the experimenter exposes the bottom half of the sheet, showing the drawings of a TOOTH and a BRUSH. The experimenter askes the child to say *TOOTHBRUSH* and after the child reponds he is asked to say it again but tooth and says NOW SAY IT AGAIN BUT WITHOUT THE TOOTH. If the child fails either demonstration item, an attempt is made to teach the child the correct response by repeating the demonstration procedure with the pictures. If the child fails again to make the correct response to both items testing is discontinued and a score of 0 is recorded. If both responses are correct, the examiner will withdraw the picture sheet and procede with the test.

AUDITORY PHONOLOGICAL SEGMENTATION & SYNTHESIS

NAME........................DATE........................
SCHOOL......................GRADE.......................
BIRTHDATE...................SEX.........................
Year Month Day

A. COW(BOY)..................B. (TOOTH)BRUSH.............

1. BIRTH(DAY)................
2. (CAR)PET..................
3. BEL(T)....................
4. (M)AN.....................
5. (B)LOCK...................
6. TO(NE)....................
7. (S)OUR....................
8. (P)RAY....................
9. STEA(K)...................
10. (L)END...................
11. (S)MILE..................
12. PLEA(SE).................
13. (G)ATE...................
14. (C)LIP...................
15. TI(ME)...................
16. (SC)OLD..................

21. (SH)RUG..................
22. G(L)OW...................
23. CR(E)ATE.................
24. (ST)RAIN.................
25. S(M)ELL..................
26. ES(KI)MO.................
27. DE(S)K...................
28. GER(MA)NY................
29. ST(R)EAM.................
30. AUTO(MO)BILE.............
31. RE(PRO)DUCE..............
32. S(M)ACK..................
33. PHI(LO)SOPHY.............
34. S(K)IN...................
35. LO(CA)TION...............
36. CONT(IN)ENT..............

17. (B)REAK...................

18. RO(DE)....................

19. (W)ILL....................

20. (T)RAIL...................

37. S(W)ING...................

38. CAR(PEN)TER...............

39. C(L)UTTER.................

40. OFF(ER)ING................